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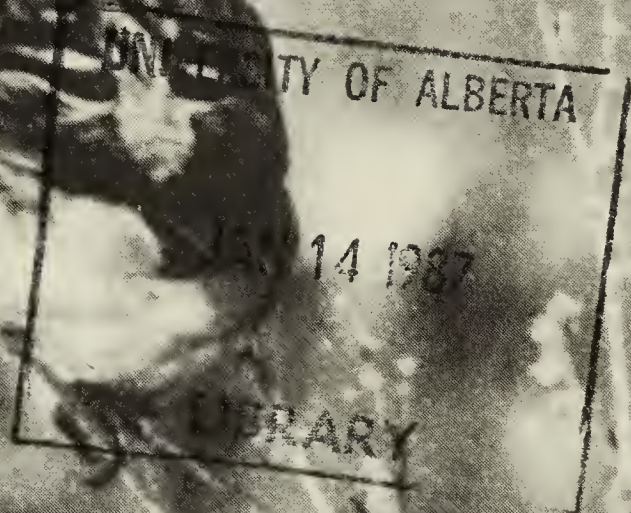
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BLUE JAY

December 1986

V.44#4



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COVER: Common Redpolls. Wayne Shiels/Four Winds Photography

BLUE JAY

Vol. 44 No. 4

December 1986

207-268

IN MEMORIAM: DICK BIRD, 1892 - 1986. *C. Stuart Houston*209

OPINION: REDBERRY LAKE SANCTUARY — WILL THE
PELICANS SURVIVE? *C. Stuart Houston*213

Plants

THE KERNEN PRAIRIE - A RELICT FESCUE GRASSLAND NEAR
SASKATOON, SASKATCHEWAN. *Bohdan Pylypec*222

A NEW LOCALITY FOR THE FRAGRANT WATER LILY IN MANITOBA.
Leonard J. Hutchison232

BLACK-EYED SUSAN DEFORMITIES. *Anthony J. Hruska*234

ADDITIONAL WILDLIFE OBSERVATIONS ALONG THE SOURIS RIVER,
MAY 1985. *Donald A. Weidl*236

Birds

OBSERVATIONS OF AN AMERICAN WOODCOCK NEST AND EGG
DATES IN MANITOBA. *Michael Monkman*238

RUBY-THROATED HUMMINGBIRD ASSOCIATING WITH A
FORAGING HAIRY WOODPECKER. *Spencer G. Sealy*241

SEX RATIOS OF BIRDS KILLED IN ONE NIGHT DURING SPRING
MIGRATION IN MANITOBA, SPRING 1983. *Spencer G. Sealy*243

GOLDEN-WINGED WARBLER AT DUCK MOUNTAIN, SASKATCHEWAN.
Stan Shadick245

POSSIBLE LESSER BLACK-BACKED GULLS AT MOOSE JAW,
SASKATCHEWAN. *Frank Brazier*247

THE MUSCLE OF BIRD FLIGHT: STRUCTURE AND FUNCTION.
Benjamin W.C. Rosser249

BLUE-RED REACHES END OF THE LINE AT NINE. *Ernie Kuyt*254

Mammals

SOLO BUT NOT ALONE. *Colleen Gerwing*257

Nature Library

ESKIMO CURLEW: A VANISHING SPECIES? Reviewed by
Edward H. Miller259

BIRD CONSERVATION, Volume 1. Reviewed by *Josef K. Schmutz*261

THE MAN WHO PLANTED TREES. Reviewed by *Sheila M. Lamont*262

Notices

HONORARY DEGREE - DR. GEORGE LEDINGHAM	263
CANADIAN PARKS AND WILDERNESS SOCIETY	263
CHRISTMAS BIRD AND MAMMAL COUNTS	264
NORTHERN FOREST OWL SYMPOSIUM	264
1987 SNHS TOURS	264
SOCIETY NEWS	265
ATTENTION SASKATCHEWAN NATURALISTS!	268



Frost on windowpane.

Sheina Wait

IN MEMORIAM: DICK BIRD, 1892-1986



Dick Bird's passing at 94 years of age on 27 September 1986, after more than two years of illness, ended a life of adventure and closed a chapter in the history of cinematography. An unusually talented and interesting man, Dick was also for much of his life a potent force in conservation education, reaching people of all ages across the breadth of this continent. His timely intervention helped keep the fledgling Saskatchewan Natural History Society solvent, and he later launched the conservation fund of the Saskatoon Natural History Society.

Born 16 August 1892, the son of a leatherworker, Dick was raised in Leamington Spa, Warwickshire, England. In 1903, he paid sixpence to see his first silent cinema film. When only 14 he emigrated to his uncle's farm near Lake Champlain in Vermont, sailing from Liverpool to Portland, Maine. In 1908 he purchased for \$2.98 from Sears Roebuck a Shamrock folding camera, which took four by five inch plate film. In 1909 he visited the Pathe Freres studio in Jersey City, New Jersey, where he received advice on the purchase of a second-hand 35 mm movie camera with a wooden tripod. Self-taught, he travelled widely for ten years, making documentary newsreels for the princely sum of \$25 per week. A bullet glanced off his head during a steelworkers' riot in Gary, Indiana, he was fired upon with poison darts by a South American Indian, he collapsed from famine in China, he was jailed in Japan, and in 1916 he was lined up before Mexican revolutionary Pancho Villa's firing squad until he waved a Union Jack and said, "Don't shoot me, I'm British." He made films of the Canadian Siberian Expeditionary Force in 1918, and for a while thereafter made his home in eastern Canada. In all, he visited 68 countries.

Dick Bird moved to Saskatchewan in 1921 to make documentary and in-

dustrial films for the Saskatchewan government. He filmed the dedication of the Albert Street bridge, the opening of Saskatchewan's first radio station, CKCK, the first drilling for oil and gas, the visit of bandleader John Philip Sousa to the RCMP barracks, the arrival of the first trans-continental automobile traveller in Regina, and visits of dignitaries including Lord Baden-Powell and Lord Tweedsmuir. He recorded Ethel Catherwood training for the Olympic high-jumping event that won her a gold medal. Dick opened his Bird Films Ltd. photographic shop in 1928.

In the 1930s Dick became serious about nature photography. In 1937 he was elected President of the Regina Natural History Society. That year he began a weekly "Camera Trails" broadcast every Thursday evening on radio station CKCK, Regina, and also published *The Camera Trailer*, illustrated with his own photographs, for distribution to his radio audience. Seven issues were published in 1937. One school teacher, Miss Ferne Barker at Tyvan, enrolled all 27 pupils, including my first cousins Janet, Evie, Allan, and John Houston, in the Camera Trailers Club. They took a pledge "To be the protectors of all birds and animals . . . Never to shoot a wild bird, unless it is a game bird, with anything but a camera." This had the double purpose of encouraging children to become interested in nature conservation and to take photographs, obtaining their film from Bird Films. Dick took time to visit some of the schools. At Tyvan and at Sanderson school near Avonlea, where interest was particularly lively, he took the children on nature hikes. Membership reached 2000, mostly children, but included 80-year-old John Teece of Abernethy. The radio program and the club folded after the eighth issue of *The Camera Trailer* in 1938. (My set ends with #8 and is thought to be complete.) Air time on CKCK was costing

Dick \$10 weekly and postage and printing another \$35, more than business warranted in the depression.

I first met Dick Bird in February 1943, as the first speaker presented by the newly-formed Yorkton Natural History Society. (Publication of the *Blue Jay* had begun only a few months earlier.) Having made the arrangements for the rental of St. Andrew's United Church, Yorkton's largest meeting place at the time, I was unfortunately ill in bed with mumps but Dick came to visit me before showing his films to a standing-room-only audience in the church. Dick donated his time. The entire proceeds went to the wartime Milk for Britain Fund. Dick also spoke to some of the Yorkton schools, telling the children that "standing on guard for Canada" meant protecting everything that goes to make up this Canada of ours, right down to the little Yellow Warbler on its nest or the first silky crocus in springtime.

Dick was an important early supporter of the Saskatchewan and the Saskatoon Natural History Societies. When the newly-formed Saskatchewan Natural History Society took over publication of the *Blue Jay* from the Yorkton society in 1950, Dick read of the society's financial dilemma in the third of the new issues edited by L.T. Carmichael. Treasurer George Ledingham reported that each quarterly issue cost \$120, and with only 500 members at \$1 each, some in arrears, the society lacked the funds needed to produce that year's fourth issue. Dick Bird promptly volunteered to give a fund-raising film night, "Camera Trails along Nature Trails," in Regina on 11 October. Proceeds of \$187 thereby rescued the fledgling society from early bankruptcy. Similarly, in November 1965 the Saskatoon Natural History Society put on a fund-raising Dick Bird Night with a film program titled "Nature at its Best." A nice profit of \$229 established the society's conservation fund, and a second Dick

Bird show titled "Alphabet of the Outdoors" added to the fund a year later.

Dick's first wife, Pansy Myrtle Fern Nix, died in 1937. Dick met Ada Bovee when she invited him to show films to her CGIT group in Avonlea. They were married in 1947 and became a successful team. Besides making movies for their own showings, Dick and Ada took film footage for Walt Disney movies for four years, 1952-1955.

Dick by this time was probably better known outside Saskatchewan than within it. His superb nature movies (including unforgettable sequences of the courtship displays of the Western Grebe and Sharp-tailed Grouse, the pre-flight wing flapping of young Ferruginous Hawks on their nest near Avonlea and the broken-wing distraction display of the Killdeer), together with his showmanship, caused him to be in great demand across the continent. His silent colour movies were augmented by his own narrative given into the microphone, much more personal than using a sound track. He never tired of presenting his material. Many summer days were spent in the field, and months each winter were spent on the lecture circuit, leaving his son-in-law in charge of his store. In 1946 he made a two-month tour of Canada sponsored by the Associated Canadian Clubs. He attracted large crowds almost everywhere; for example at a Federation of Ontario Naturalists showing in Convocation Hall, Toronto, in 1948, he had an audience of 1700 and another 1000 were turned away. Frequently he gave lecture tours throughout the United States — once speaking in 148 cities in 156 days. Prestigious and appreciative audiences included those at Harvard University, the National Geographic Society, and the Smithsonian. For some years his tours were sponsored by the National Audubon Society. Virtually every society brought him back again the next year to show a different film.

Dick received many honours. Lacking formal education, he earned letters after his name the hard way, through achievement, and became A.R.P.S., F.Z.S., F.P.S.A. and LL.D. In 1919 he became the first president of the Canadian Press Photographers Association. Later he became an Associate of the Royal Photographic Society and a Fellow of the Zoological Society of London, England (one of four Canadians then allowed to use "F.Z.S." after their names). In 1950 he was the second Canadian, after Yousuf Karsh, to become a Fellow of the Photographic Society of America and in that year he also became the first Life Member of the Saskatchewan Natural History Society. He received an honorary LL.D. degree from the University of Regina in May 1976. At age 87, in 1979, he was honoured as Saskatchewan's Pioneer Cinematographer at the International Film Festival in Yorkton, and his movie, "The Ukrainians," made 58 years earlier, was shown. (Bird had recorded on film a gathering of 2000 Ukrainians

and 2000 of their children from 50 schools near Hafford in June 1921.)

When Robert Collins did a feature story in *Maclean's Magazine* on 2 April 1955 he quoted Harris B. Tuttle, an enthusiastic Eastman-Kodak executive who gave his opinion that Dick and Ada were "probably the outstanding photographers of birds and wildlife in North America." Perhaps Dr. Norman Church summed up Dick Bird best when he presented him for his honorary degree in 1976:

"His long career in cinematography and his outstanding professional contribution to the film industry are but one part of his exciting life; another part . . . is his love of nature and how he projected that love to generations of children, with lectures and pictures depicting the need for conservation of all wild life. In this he has added much to the sum of human happiness." — C. Stuart Houston, 863 University Drive, Saskatoon, Saskatchewan. S7N 0J8



Dick, Bird, 1973.

OPINION: REDBERRY LAKE SANCTUARY — WILL THE PELICANS SURVIVE?

C. STUART HOUSTON, 863 University Drive, Saskatoon, Saskatchewan. S7N 0J8



Young pelicans about a week old, vulnerable to hot sun when adult flushed from nest
C.S. Houston

Recent plans for a massive commercial development at Redberry Lake, 100 km northwest of Saskatoon, Saskatchewan, are highly controversial and of particular concern to naturalists. From the perspective of 32 years of banding birds there, I am convinced that Redberry Lake is one of western Canada's most important bird sanctuaries.

What are the issues in this confrontation? On the one hand, conservationists see only problems: one endangered bird species, one threatened species, and the

continent's best-researched population of a third; a stagnant lake with no outlet; dropping water levels; increasing salinity; unstable, slumping slopes; a shoreline that is sometimes sandy, sometimes muddy.

On the other hand, commercial interests favouring "development" see the issues in terms of an increasing demand for resort areas; the proximity to Saskatoon; development and employment prospects; an innovative (but expensive, short-term and still experimental) fish-stocking plan.

Who will win? Piping Plovers, White Pelicans, White-winged Scoters and the environmentalists? Or the bank accounts of a selected few? I would like to share with other naturalists my wildlife perspective on this debate.

Plans for a double-barrelled project at Redberry Lake were unveiled early in 1985. On the one hand, Saskatchewan Fisheries announced a 5-year program to stock the lake with 650,000 Rainbow Trout each year, at an annual cost of \$70,000. At the same time, Boris Mamchur announced plans to build a \$3.5 million resort at Redberry Lake, complete with a lodge, a restaurant, a gas bar, a 375-lot cottage subdivision, and a 360-stall marina.

A dramatic controversy immediately arose. The pros and cons got front-page attention in the Battleford Telegraph on 26 April and the Saskatoon Star-Phoenix on 30 April (1985). Facts and opinions were intermingled as Redberry Lake became a hot news topic on radio and television as well as in the newspapers.

Politically, the fact that Paul Meagher, Progressive-Conservative MLA for Prince Albert, was a partner of Boris Mamchur in the proposed development while simultaneously serving as legislative secretary to the Minister of Parks and Renewable Resources led to charges of a possible conflict of interest. On 2 May, Meagher was suspended as legislative secretary to the department.

Socio-economically, the prospect of investment and jobs took precedence with the local councils of the town of Hafford, the rural municipality of Redberry, and the board of the regional park. All expressed support for the development.

A vocal minority, however, quickly organized to offer effective opposition. Connie Gramiak, a bee-keeper at the southwest corner of Redberry Lake,

organized the Redberry Environmental Group and soon obtained about 100 local signatures opposing the development. These vigorous opponents of development did their homework more thoroughly than their opponents. Connie Gramiak and her group soon had the support of the Saskatchewan Wildlife Federation, the Saskatchewan and Saskatoon Natural History Societies, the Canadian Nature Federation and the World Wildlife Fund.

From the hydrological perspective, Redberry Lake is a "dead sea," an internal drainage basin (lake without an outlet), similar to Utah's Great Salt Lake. Unlike its southern counterpart whose water levels have recently risen higher than in recorded times, Redberry's water levels have decreased drastically and fairly steadily throughout this century. A 1906 survey showed a shoreline as much as 1200 feet horizontally beyond (even farther in the southwest corner) and about 12 feet vertically above the present shoreline. When W.W. Coleman published his photographs of a large pelican colony and a small cormorant colony in the late 1930s, Pelican Island was small with only the rocky upland portion of the present island above water.²

When Mary and I first visited the lake with George Ledingham and Frank Roy in 1955, there was a pelican island near the south end and two gull islands in the north end of the lake. As water levels dropped, the two gull islands fused to form an island about 1 km long. Later, about 1963, "New Tern Island" emerged from the waters in the southwest corner of the lake. In wet years water levels roughly hold their own, but in dry years the lake recedes.

Saline lakes have the advantage of increased buoyancy for swimmers. The corresponding disadvantage is that you

must shower with fresh water after swimming, to remove the irritating salt particles. Those using fast motorboats soon find their windscreen nearly opaque with salt.

From the limnological point of view, the decreasing water levels have caused increasing salinity.^{4 8} In 1940, whitefish were introduced into the lake and for years provided commercial fishing in winter, until the lake gradually became too salty to support any type of freshwater fish. Rainbow Trout, like most members of the salmon family are "anadromous." In their natural environment they hatch in freshwater rivers and then move to the ocean to mature before returning to spawn in fresh water. In the early 1980s, experiments showed that Rainbow Trout appeared to be the only realistic candidate available for fish restocking. Redberry's current salinity, two-thirds that of the ocean, is not a problem for Rainbow Trout, but the lake's unusual composition of salts, including a high concentration of magnesium, could cause difficulty. The Rainbow Trout may or may not succeed.

Anglers may or may not take full advantage of this new opportunity. Different fishing techniques, including fishing with worms and fly-fishing, are possible and may be necessary to have successful angling; we have relatively few dedicated fly-fishermen in Saskatchewan. Finally, the \$70,000 annual expense of Rainbow Trout introduction greatly diminishes the attractiveness of the venture.⁵ The 1985 Rainbow Trout introduction was a failure, but the 1986 introduction shows signs of success.

Geologically, the site chosen by the developers leaves much to be desired. I looked at stereoscopic aerial photographs of Redberry Lake with engineering student and Rhodes scholar, John Melin. John pointed out that most other shores of the lake are stable, but the slopes on

the west side where the development is proposed, appear unstable. Watering of lawns in the development would be harmful and cause slumping, and cottage foundations might sag. I demonstrated before TV cameras in 1985 the muckiness of the shoreline, with my bare feet disappearing in the muck at each step, a striking contrast to nice sand beaches at the northwest and southeast corners of the lake.

Over and above all these considerations, it is the ecological viewpoint that merits our attention. I wish to tell you why.

First are the gulls. Ring-billed and California Gulls are a valuable economic asset to the surrounding area, as they eat prodigious quantities of insects, ranging out for 80 km from their nests to gather food for their hungry young. The absence of serious grasshopper infestation around Redberry Lake in recent years, in striking contrast to much of the province, is, I believe, largely attributable to these gulls.

Although gulls can withstand much more human pressure than the other colonial birds, it is nevertheless a fact that no young gulls have been raised on Gull Island, opposite the regional park, in 1982, 1983, 1984, 1985 or 1986. Up to and including 1981, this long island was Redberry's major gull production area, with several thousand pairs producing thousands of young each year. It seems that each year more large boats zip around this island, pulling more water-skiers and even parachute gliders from the modest but increasingly busy Regional Park on the opposite shore. On weekends there are, as William Langley said at the Hafford hearing on 8 May 1986, "too many hot dogs, hamburgers, honky-tonks and Honda bikes." We strongly suspect, from canine footprints in the muddy shore, that cottage-owners' dogs have somehow reached the



Ring-billed Gull chick and egg

Larry A. Morgotch

island on occasion and may have been the cause of massive nest desertion.

Dislocation of thousands of gulls has had an adverse effect on the other birds, particularly the Common Terns. The terns once had to themselves the small island in the southwest corner of the lake, which emerged about 1963. Since then most terns have nested near its rocky northern tip. Beginning in 1981, this part of the little island became crowded with the displaced gulls, causing a much higher mortality of nestling terns from the predatory gulls. Finally, in 1986, the terns moved to a grassy slope near the southeastern part of this island and enjoyed reasonable success for the first time in five years.

Next are the American White Pelicans, classed as a "threatened" species because so few lakes in North America

remain with undisturbed islands on which they can nest. Nearly one-third of the world's remaining pairs nest on about 10 Saskatchewan lakes.⁹ Highly specialized birds, with large 13-litre gular pouches for scooping up minnows, their beaks literally, as the well-known verse tells us, "hold more than their belly can." These birds nest on islands because they are so large and clumsy, and vulnerable to mammalian predators on land, even though they are such graceful birds in the air.

Pelicans leave their nests whenever humans approach. When pelicans are flushed from their nests during the egg season, the braver gulls puncture and eat the pelican eggs. The young pelicans when first hatched are completely naked, and in the hot mid-day sun, or during cooler wet weather, may perish within 10 minutes after the sheltering

Table 1. PELICANS AND CORMORANTS BANDED AT REDBERRY LAKE

Year	Days	White Pelican		D-c Cormorant	
1955	23 July	82	(100+ unbanded)	10	(20+ unbanded)
1956	1, 11 July	259		46	
1957	10 July	123		0	
1958	30 June	233	(30+ too small)	61	
1959	no visit				
1960	25 June	87	(30+ too small)	0	
1961	25 June, 23 July	222		5	
1962	no banding				
1963	14 July	47		0	
1964	12 July	190		39	
1965	1 July	77		50	
1966	1,9 July	182		64	
1967	16 July	111	(139 nests)11	25	(5 too small)
1968	2,15 July	88		52	
1969	1,12 July	55		60	
1970	3,25 July	114		29	
1971	29 June	131	(80 nests)1	35	
1972	28 June	99		17	
1973	8,19 July	72		19	
1974	no visit				
1975	4,16 July	109		13	
1976	10 July	142	(89 nests,CWS)	21	
1977	1 July	149		34	
1978	1,20 July	39	(72 nests)12	10	(24 nests,Roney)
1979	7 July	123		12	
1980	5 July	156	(168 nests)13 (6 too small)	59	(43 nests,Roney) (4 too small)
1981	4 July	154		41	
1982	4,12 July	175	(240 nests,CWS)	77	
1983	2 July	145		20	(40 dead hailstorm)
1984	5 July	163		42	
1985	5 July	192	(347 nests,CWS)	89	
1986	7 July	257		109	
TOTALS			4276	1039	

NOTE: CWS = Canadian Wildlife Service survey. CWS and Roney nest counts were by aerial survey, 1967 by boat visit.

parent flies off. Overall numbers of pairs nesting at Redberry have actually increased in recent years (Table 1).^{1 7 8 12 13} yet the number of young fledged per nest

decreased after 1976, when 1.6 young were produced per active nest, falling to 0.5, 0.7 and 0.6 young per nest, respectively, in 1978, 1982 and 1985.



Pelican nest, vulnerable to gull predation when adult flushed

C.S. Houston



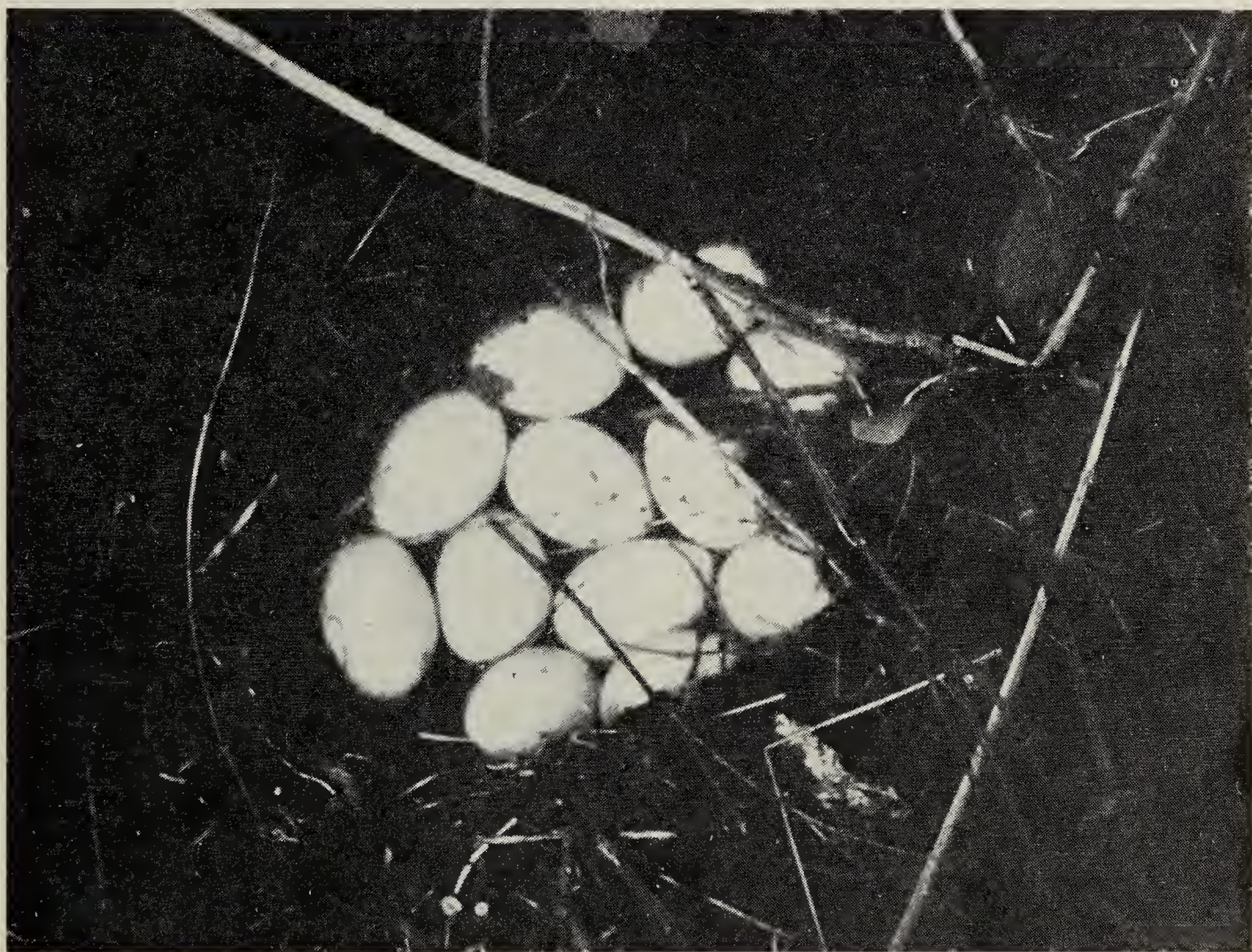
Young American White Pelicans at Redberry Lake

R.W. Cram

The White-winged Scoter is one of our most specialized ducks. It is heavy, weighing more than a mallard, and is clumsy in taking flight. It prefers to nest on islands. My initial banding of this species was random and unplanned, involving adults caught as I reached into a gooseberry clump to pick up a young gull or pelican. Redberry Lake islands have the most concentrated nesting populations ever reported, and I therefore encouraged and assisted graduate students from the Universities of Missouri, Maine and Guelph to do scientific studies here. Pat and Mary Ann Brown and their assistants did intensive research on scoters for six summers (1975-1980) and Pat Kehoe and his assistants resumed the studies in 1984 and 1985. Most of what is known about this species in North America has been learned at Redberry Lake.

As a result of concentrated efforts to recapture randomly banded females, the Brown-Kehoe-Houston team holds the records for the six oldest White-winged Scoters in North America. The oldest is a female, which I banded on her nest in July 1969, and which Pat Kehoe recaptured on her nest in 1985. Since scoters do not nest before they are two years old, this duck was at least 18 years old when recaptured!

West of "Gramiak Island", now Gramiak peninsula because of low water levels, is the channel that acts as the "creche" site where most of the surviving scoter ducklings not devoured by the gulls are reared. This channel was due to be obstructed by a large marina, but the developer, when informed of the ecological importance of the channel, eliminated the marina from his overall plan.



White-winged Scoter nest

C.S. Houston

Finally, the endangered Piping Plover was one of the most typical birds of the Redberry beaches in the 1950s and 1960s, distributed around the entire shoreline, both island and mainland. Human pressures throughout North America have since had a more adverse effect than anticipated, and the North American Piping Plover population has declined to roughly 3000 pairs. Close to half of the remaining pairs of this beautiful little bird breed on a relatively small number of Saskatchewan lakes. The developer has made much of the fact that a one-visit survey in 1984 found no birds on the beach area slated for development;³ this part of the beach also did not have deer or grouse habitat and was therefore removed from the "critical wildlife habitat" designation. However, a pair of Piping Plovers nested on this very segment of shoreline in 1985 (Jim Slimmon watched the female settle on her eggs) and again in 1986.

Some government activities have helped. Relatively modest and infrequent protection efforts by governments have paid large dividends on a small investment. First reserved for a federal migratory bird sanctuary in 1915, the Saskatchewan government proclaimed the islands of Redberry lake as a game preserve in 1947.

The Saskatoon Natural History Society proposed in 1962 that "...the islands of Redberry Lake and the waters within half a mile of the islands be preserved unmolested." In reply, the Honourable A.G. Kuziak, then Minister of Natural Resources, assured the society that his department planned "no recreation developments for Redberry lake in the immediate future." (Blue Jay 20:77, 1962). However, regional parks soon became the rage and the Redberry Lake Regional Park was proclaimed by the Saskatchewan Department of Culture and Youth in 1968.

Signs were placed on the main nesting island, "Pelican Island," in the 1960s by the Canadian Wildlife Service and the Saskatchewan Department of Parks and Renewable Resources. These made a noticeable impression on most members of the boating public, for beer bottles and cans thereafter ceased to be found in and near the pelican colony. A much larger sign, with large print proclaiming that visitors must keep 100 m distance from the island, was erected in the fall of 1985 and may have contributed to the large number of young pelicans banded in 1986 (257, surpassed only once by the 259 raised in 1956). Assuredly most members of the public are motivated by curiosity, not maliciousness, when they land at a pelican colony. Although most are ignorant of the risk they pose to the birds, the vast majority are law-abiding and are influenced by well-placed, informative signs. The small minority, forming the class of "ecologic vandals", were encountered only once at Redberry: one year young people with their boat and large motor repeatedly ran over the young gulls swimming in the water, killing and maiming them, in spite of our shouts and fists waved from the nearby shore.

Saskatchewan is blessed with literally thousands of northern lakes that are suitable for recreation with only minimal disadvantageous impact on wildlife. Redberry Lake, in striking contrast, has been a precious, unique sanctuary since 1915. It has served as an outdoor laboratory, first for limnologists and later for ornithologists, and has been the site of important long-term studies. It contains sensitive species that cannot, much as we would like to pretend otherwise, coexist for long with heavy human use. Round-the-clock protection of the Redberry Lake islands would require three full-time wardens for three months each summer, an expense that government is not likely to undertake; even such coverage could

not prevent every brief, damage-causing visit to the islands. Redberry Lake lacks the protection afforded Lavallee Lake (the third largest pelican colony in North America) by remoteness and restricted access within a National Park.¹¹ It is more likely to follow the same path as Last Mountain Lake, where human pressure has prevented appreciable nesting success since 1954.⁴ The gradual development of the regional park has already taken a heavy toll on nesting gulls, allowing one to extrapolate with some certainty concerning the damaging effects a large commercial development would inflict on both pelicans and plovers.

Should Redberry's convenient proximity to Saskatoon, its chief attraction, be allowed to destroy forever its present capacity to raise annual crops of scoters, pelicans and Piping Plovers? As Connie Gramiak said at the Hafford hearing, the question to be answered is this: Should Redberry Lake enrich all of us spiritually or a few of us financially?



Common Tern, Redberry Lake J. Asai

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THE KERNEN PRAIRIE - A RELICT FESCUE GRASSLAND NEAR SASKATOON, SASKATCHEWAN

BOHDAN PYLYPEC, Department of Crop Science and Plant Ecology, University of Saskatchewan, Saskatoon, Saskatchewan. S7N 0W0

Introduction

On the northeast outskirts of Saskatoon 8 km from the city centre lies the Kernen Prairie, a 130 ha tract of virgin Plains Rough Fescue (*Festuca altaica*) grassland completely surrounded by tilled fields. It has been spared from cultivation and heavy grazing by domestic animals due to the foresight of Fred Kernen who protected this valuable land and donated it to the University of Saskatchewan in 1977 with the condition that it remain in its native state. The ecological significance of this prairie is tremendous, considering its location in an area of intensive agricultural development and its proximity to a large urban centre.

In 1985 and 1986 a detailed survey of the vegetation of the prairie was conducted. This report summarizes some of the results, with emphasis on a checklist of the flora.

Study Area

The Kernen Prairie (E1/2 8-37-4-W3rd, elevation 510 m) lies on glaciolacustrine deposits laid down by glacial Lake Saskatchewan some 12,000 years ago.⁴ A broad north-south ridge of sandy Bradwell loam soil gently slopes (1-1.5°) to each side where fine textured clayey Sutherland soils are present.¹¹

Though the prairie is relatively flat,



Fescue - Speargrass with Pasture Sage; snowberry in background.

several features provide variety in the micro-relief, microclimate and vegetation. Along the ridge numerous pits 0.5-1.0 m deep occur, each floored with a flat dolomitic boulder. The origins of these pits are unclear. They have been termed "bovarcinations" by some, in the belief that they represent bison wallows; but more likely, they have been formed when wind erosion removed soil around the shallow-rooted vegetation above the boulders. Scattered throughout the prairie are somewhat elevated "mima mounds," named after the Mima Prairie in Washington State where this phenomenon was first noted.⁶ Disturbance by ground squirrels and pocket gophers at these sites facilitates invasion by weedy species and also attracts predatory animals such as Red Foxes, Northern Harriers and Short-eared Owls, and until recently, Burrowing Owls. The sites are fertile and highly productive, and often the older ones are covered by dense stands of Western Snowberry (*Symphoricarpos occidentalis*). In low areas on the prairie, the Sutherland soils

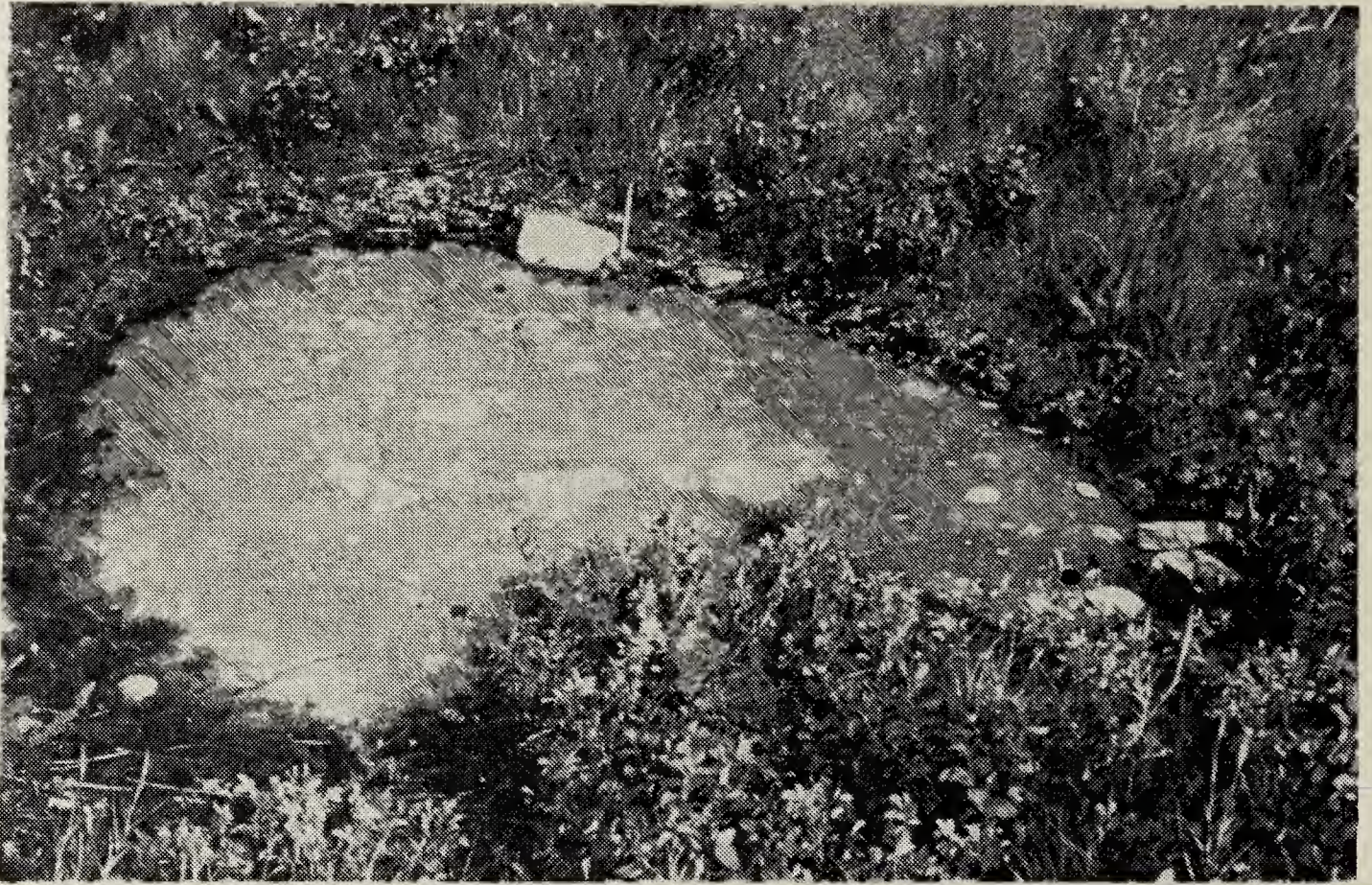
are cracked into polygon shapes about a metre across. These soils contain a high proportion of montmorillonitic clay which expands greatly upon wetting and contracts upon drying - the result is a pattern of polygons outlined by trenches and with central "puffs". These changes in micro-relief are accompanied by changes in soil and vegetation characteristics.² The Kernan Prairie also contains a number of temporary potholes with open water until about mid-July.

Vegetation

The prairie lies in the transition area between fescue prairie and aspen parkland, and also contains important species from the mixed grassland.^{5 10} Plains Rough Fescue is the dominant species with Western Porcupine Grass (*Stipa curtiseta*) and Northern Wheatgrass (*Agropyron dasystachyum*) also being important, especially on the upper slopes.³ Trembling Aspen (*Populus tremuloides*) is present in four low-lying areas, but the most important woody species are shrubs including Western Snowberry, Silver-



Mainly fescue and snowberry; Silverberry and Poplar in background.



"Bovarcination" with exposed dolomitic rock. Note pencil in background.



Snowberry on old "mima mound" surrounded by more snowberry and Fescue; Poplar in background.



Soil polygons with Fescue dominant



Low-lying area surrounded by meadowsweet and snowberry; silverberry, dock, Manitoba Maple and Poplar in background.

berry (*Elaeagnus commutata*), Narrow-leaved Meadowsweet (*Spiraea alba*) and roses (*Rosa arkansana* and *Rosa woodsii*) that are present in all but the driest sites. The shrubby vegetation continues to provide excellent habitat for Savannah Sparrows and other passerines as was the case 15 years ago.^{7 8}

Surveys in 1985 using systematically placed 0.25 m² quadrats revealed that shrubs and trees occupy 15.3% cover, grasses and graminoids 79.7% and forbs 14.3% (Table 1). (The values total more than 100% because the vegetation stratifies more than one layer on occasion).

In addition to the 70 vascular plant species recorded in cover surveys, other species were collected outside the quadrats on the prairie and deposited as

voucher specimens in the W.P. Fraser Herbarium at the University of Saskatchewan. A total of 165 species in 34 families have been collected (Appendix) indicating that this homogeneous-appearing area is, upon closer inspection, quite diverse.

The checklist includes 24 grasses, 10 sedges, 14 woody species (trees and shrubs) and 117 forbs. In addition, five other species indicated with an asterisk (*) in the Appendix were recorded by Baines in 1963 although no voucher specimens are available.^{2 3}

Baines attributed the species diversity to a soil moisture gradient occurring at the prairie.^{2 3} For example, among the graminoids, Western Porcupine Grass, Northern Wheatgrass and Blue Grama (*Bouteloua gracilis*) occur on xeric sites,

Table 1. PERCENT COVER OF PLANT SPECIES RECORDED IN SYSTEMATIC COVER SURVEYS OF 1985.

<i>Shrubs and trees cover</i>		%
Western Snowberry (<i>Symphoricarpos occidentalis</i>)		11.3
Roses (<i>Rosa arkansana</i> and <i>Rosa woodsii</i>)		1.9
Narrow-leaved Meadowsweet (<i>Spiraea alba</i>)		1.0
Silverberry (<i>Elaeagnus commutata</i>)		0.7
Trembling Aspen (<i>Populus tremuloides</i>)		0.4
Total		15.3
<i>Grasses and graminoids</i>		
Plains Rough Fescue (<i>Festuca altaica</i>)		39.1
Western Porcupine Grass (<i>Stipa curtiseta</i>)		15.9
Sedges (<i>Carex</i> spp.)		14.1
Northern Wheatgrass (<i>Agropyron dasystachyum</i>)		7.2
Smooth Brome (<i>Bromus inermis</i>)		1.1
Western Wheatgrass (<i>Agropyron smithii</i>)		1.0
10 other species		1.3
Total		79.7
<i>Forbs</i>		
Northern Bedstraw (<i>Galium boreale</i>)		3.6
Pasture Sage (<i>Artemisia frigida</i>)		1.7
Crocus Anemone (<i>Anemone patens</i>)		1.3
Many-flowered Aster (<i>Aster ericoides</i>)		1.3
American Vetch (<i>Vicia americana</i>)		1.0
44 other species		5.4
Total		14.3

Plains Rough Fescue and Slender Wheatgrass (*Agropyron trachycaulum*) on more mesic sites, while in the wettest areas, one can find Slough Grass (*Beckmannia syzigachne*), Tall Manna Grass (*Glyceria grandis*) and Awned Sedge (*Carex atherodes*). Since the prairie is in a transition area between aspen parkland and fescue grassland, species typical of both regions are represented. In addition, important species from the mixed prairie are present, particularly on more xeric sites. A number of weedy species occur, too, which is to be expected considering the area is surrounded by cultivated fields.

Baines indicated that the Kernen Prairie was acquired by the Kernen family in 1917.² The area was grazed by cattle and horses until the 1930s. Since then, disturbance has been minimal. In 1948, one summer of light grazing occurred, and approximately 25 ha were mowed in 1959. Aerial photographs from 1950 also reveal an airstrip approximately 1300 m long and 10 m wide, extending north-south in the eastern half of the prairie.

This area was tilled in 1963 and now is covered with Smooth Brome, Alfalfa (*Medicago sativa*) and native grasses including Western Wheatgrass and Northern Wheatgrass. Since 1963 the area has not been disturbed. Aerial photographs since 1944 have revealed that the shrubbery is now more prominent. Litter has built up, and the site appears to be more mesic than before. For example, Blue Grama, a xeric species, is found only in traces, whereas 23 years ago Baines noted the species had a frequency of 21% and was noted in stands on the driest upper and mid-slopes.^{2 3} In similar locations, he also noted another xeric species, Needle-and-thread (*Stipa comata*) with a frequency of 7.5%, whereas this study did not record this species at the prairie. Thus, without the influence of grazing, mowing and fire, the vegetation has changed and probably simplified. In the past, it is likely that fire was a major force in grasslands such as the Kernen Prairie.^{1 9} Consequently, current plans for managing this prairie include studies of prescribed burning.



Speargrass - fescue with Winterfat and Pasture Sage; Silverberry, snowberry and Poplar in background.

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Beautiful Sunflower, Helianthus subrhomboideus

Appendix. CHECKLIST OF FLORA OF THE KERNEN PRAIRIE

PTERIDOPHYTA - Ferns and fern allies

SELAGINELLACEAE - Spike-moss family

Selaginella densa Rydb. - Prairie Selaginella

SPERMATOPHYTA - Seed-bearing plants

ANGIOSPERMAE

MONOCOTYLEDONAE

GRAMINEAE - Grass family

Agrohordeum macounii (Vasey) Lepage -
Macoun's Wild Rye

Agropyron albicans var. *albicans* Scribn. &
Smith) Awned Northern Wheatgrass

Agropyron albicans var. *griffithsii* (Scribn. &
Smith) Beetle - Awned Northern
Wheatgrass

Agropyron dasystachyum (Hook.) Scribn. -
Northern Wheatgrass

Agropyron pectiniforme R. & S. - Crested
Wheatgrass

Agropyron repens (L.) Beauv. - Quack Grass

Agropyron smithii Rydb. - Western Wheatgrass

Agropyron subsecundum (Link) Hitchc. - Awn-
ed Slender Wheatgrass

Agropyron trachycaulum var. *trachycaulum*
(Link) Malte - Slender Wheatgrass

Agrostis scabra Willd. - Rough Hair Grass

Beckmannia syzigachne (Steud.) Fern. - Slough
Grass

Bouteloua gracilis (HBK.) Lag. - Blue Grama

Bromus inermis Leyss. - Smooth Brome

Calamagrostis inexpansa A. Gray - Northern
Reed Grass

Danthonia intermedia Vasey - Timber Oat
Grass

Festuca altaica Trin. ssp. *hallii* (Vasey) Harms
- Plains Rough Fescue

Glyceria grandis S. Wats. - Tall Manna Grass

Helictotrichon hookeri (Scribn.) Henr. -
Hooker's Oat Grass

Hordeum jubatum L. - Wild Barley

Koeleria cristata (L.) Pers. - June Grass

Muhlenbergia richardsonis (Trin.) Rydb. - Mat
Muhly

Poa cusickii Vasey - Early Bluegrass

Poa interior Rydb. - Wood Bluegrass

Poa pratensis L. - Kentucky Bluegrass

**Stipa comata* Trin. & Rupr. -
Needle-and-thread

Stipa curtiseta (A.S. Hitchc.) Barkworth -
Western Porcupine Grass

Stipa viridula Trin. - Green Needle Grass

CYPERACEAE - Sedge family

Carex aenea Fern. - Silvery-flowered Sedge

Carex atherodes Spreng. - Awned Sedge

Carex eleocharis Bailey - Low Sedge

Carex filifolia Nutt. - Thread-leaved Sedge

Carex lanuginosa Michx. - Woolly Sedge

Carex obtusata Lilj. - Blunt Sedge

Carex pensylvanica Lam. - Sun-loving Sedge

Carex praegracilis W. Boott - Graceful Sedge

**Carex siccata* Dewey - Hay Sedge

Carex xerantica Bailey - White-scaled Sedge

Eleocharis palustris (L.) R. & S. - Creeping
Spike-rush

JUNCACEAE - Rush family

Juncus balticus Willd. - Baltic Rush

Juncus dudleyi Wieg. - Dudley's Rush

LILIACEAE - Lily family

Smilacina stellata (L.) Desf. - Star-flowered
Solomon's-seal

IRIDACEAE - Iris family

Sisyrinchium montanum Greene - Common
Blue-eyed Grass

DICOTYLEDONAE

SALICACEAE - Willow family

Populus tremuloides Michx. - Trembling Aspen

Salix bebbiana Sarg. - Beaked Willow

Salix petiolaris Sm. - Basket Willow

URTICACEAE - Nettle family

Urtica dioica L. var. *procera* (Muhl.) Wedd.
- Stinging Nettle

SANTALACEAE - Sandalwood family

Comandra umbellata (L.) Nutt. var. *umbellata*
- Bastard Toadflax

POLYGONACEAE - Buckwheat family

Polygonum coccineum Muhl. forma *terrestre*
(Willd.) Stanford - Water Smartweed

Polygonum convolvulus L. - Wild Buckwheat

Rumex acetosa L. - Sour Dock

Rumex pseudonatronatus Borbas - Field Dock

CHENOPODIACEAE - Goosefoot family

Atriplex nuttallii S. Wats. - Nuttall's Atriplex

Chenopodium album L. - Lamb's-quarters

Eurotia lanata (Pursh) Moq. - Winterfat

* Species recorded by Baines; no voucher specimen available.

Kochia scoparia (L.) Schrad. - Kochia
Monolepis nuttalliana (R. & S.) Greene - Spear-leaved Goosefoot
Salsola kali L. var. *tenuifolia* Tausch. - Russian-thistle

CARYOPHYLLACEAE - Pink family
Cerastium arvense L. - Field Chickweed
Saponaria vaccaria L. - Cow Cockle
Stellaria longipes Goldie - Long-stalked Stitchwort

RANUNCULACEAE - Crowfoot family
Anemone canadensis L. - Canada Anemone
Anemone patens L. var. *wolfgangiana* (Bess.) Koch.) Crocus Anemone
Thalictrum venulosum Trel. - Veiny Meadow-rue

CRUCIFERAE - Mustard family
Arabis divaricarpa A. Nels. - Purple Rock Cress
Arabis hirsuta (L.) Scop. - Hirsute Rock Cress
Arabis hoeboellii Hornem. - Reflexed Rock Cress
Brassica kaber (DC.) L.C. Wheeler - Wild Mustard
Descurainia richardsonii (Sweet) O.E. Schulz var. *richardsonii* - Gray Tansy Mustard
Descurainia sophia (L.) Webb. - Flixweed
Erysimum cheiranthoides L. - Wormseed Mustard
Erysimum inconspicuum (S.Wats.) MacM. - Small-flowered Prairie Rocket
Lepidium densiflorum Schrad. - Common Pepper-grass
Lesquerella arenosa (Richards.) Rydb. - Sand Bladderpod
Sisymbrium altissimum L. - Tumbling Mustard
Thlaspi arvense L. - Stinkweed

SAXIFRAGACEAE - Saxifrage family
Heuchera richardsonii R. Br. - Alumroot
Ribes oxycanthoides L. var. *oxycanthoides* - Northern Gooseberry

ROSACEAE - Rose family
Amelanchier alnifolia Nutt. - Saskatoon
Crataegus chrysocarpa Ashe - Round-leaved Hawthorn
Fragaria virginiana Dcne. - Smooth Wild Strawberry
Geum triflorum Pursh - Three-flowered Avena
Potentilla arguta Pursh - White Cinquefoil
Potentilla concinna Richardson - Early Cinquefoil
Potentilla gracilis Dougl. var. *glabrata* (Lehm.) Hitchc. - Graceful Cinquefoil

Potentilla gracilis Dougl. var. *gracilis* - Graceful Cinquefoil
Potentilla pensylvanica L. var. *atrovirens* (Rydb.) T. Wolf - Prairie Cinquefoil
Prunus virginiana L. - Chokecherry
Rosa acicularis Lindl. - Prickly Rose
Rosa arkansana Porter var. *arkansana* - Low Prairie Rose
Rosa woodsii Lindl. - Wood's Rose
Spiraea alba Du Roi - Narrow-leaved Meadowsweet

LEGUMINOSAE - Pea family
Astragalus adsurgens Hook. - Ascending Purple Milk-vetch
Astragalus agrestis Dougl. - Purple Milk-vetch
Astragalus flexuosus Dougl. - Slender Milk-vetch
Astragalus pectinatus Dougl. - Narrow-leaved Milk-vetch
Medicago falcata L. - Yellow Lucerne
Medicago sativa L. - Alfalfa
Melilotus alba Medic. - White Sweet-clover
Melilotus officinalis (L.) Pall. - Yellow Sweet-clover
Oxytropis campestris (L.) DC. var. *gracilis* (A. Nels.) Barneby - Late Yellow Locoweed
Oxytropis sericea Nutt. var. *spicata* (Hook.) Barneby - Early Yellow Locoweed
Psoralea argophylla Pursh - Silverleaf Psoralea
Psoralea esculenta Pursh - Indian Breadroot
Thermopsis rhombifolia (Nutt.) Richardson - Golden-bean
Vicia americana Muhl. var. *angustifolia* Nees - American Vetch

LINACEAE -Flax family
Linum lewisii Pursh - Lewis' Wild Flax

ACERACEAE - Maple family
Acer negundo L. var. *interius* (Britt.) Sarg. - Manitoba Maple

MALVACEAE - Mallow family *Sphaeralcea coccinea* (Nutt.) Rydb. - Scarlet Mallow

VIOLACEAE - Violet family
Viola adunca J.E. Smith - Early Blue Violet
Viola nuttallii Pursh - Nuttall's Yellow Violet
Viola pedatifida G. Don - Crowfoot Violet

ELAEAGNACEAE - Oleaster family
Elaeagnus commutata Bernh. - Silverberry
Shepherdia argentea Nutt. - Buffaloberry

ONAGRACEAE - Evening-primrose family
Epilobium ciliatum Raf. var. *ciliatum* - Northern Willowherb

UMBELLIFERAE - Parsley family
Lomatium macrocarpum (Hook. & Arn.) Coult. & Rose) Long-fruited Parsley
Zizia aptera (Gray) Fern. - Heart-leaved Alexanders

PRIMULACEAE - Primrose family
Androsace septentrionalis L. - Pygmyflower
Lysimachia ciliata L. - Fringed Loosestrife

POLEMONIACEAE - Phlox family
Collomia linearis Nutt. - Narrow-leaved Collomia
Phlox hoodii Richardson - Moss Phlox

BORAGINACEAE - Borage family
Hackelia deflexa Wahl. (Opiz.) var. *americana* (Gray) Fern. & Johnston - Nodding Stickseed
Lappula echinata Gilib. - Bluebur

LABIATAE - Mint family
Mentha arvensis L. var. *villosa* (Benth.) S.R. Stewart - Field Mint
Stachys palustris L. var. *pilosa* (Nutt.) Fern. - Marsh Hedge-nettle

SOLANACEAE - Potato family
Solanum triflorum Nutt. - Wild Tomato

SCROPHULARIACEAE - Figwort family
Orthocarpus luteus Nutt. - Owls's-clover
Penstemon gracilis Nutt. - Lilac-flowered Beardtongue
Penstemon procerus Dougl. - Slender Beardtongue

RUBIACEAE - Madder family
Galium boreale L. - Northern Bedstraw

CAPRIFOLIACEAE - Honeysuckle family
Symphoricarpos occidentalis Hook. - Western Snowberry

CAMPANULACEAE - Bluebell family
Campanula rotundifolia L. - Harebell

COMPOSITAE - Composite family
Achillea millefolium L. - Yarrow
Agoseris glauca (Pursh) Raf. - False Dandelion
Antennaria parvifolia Nutt. - Small-leaved Everlasting

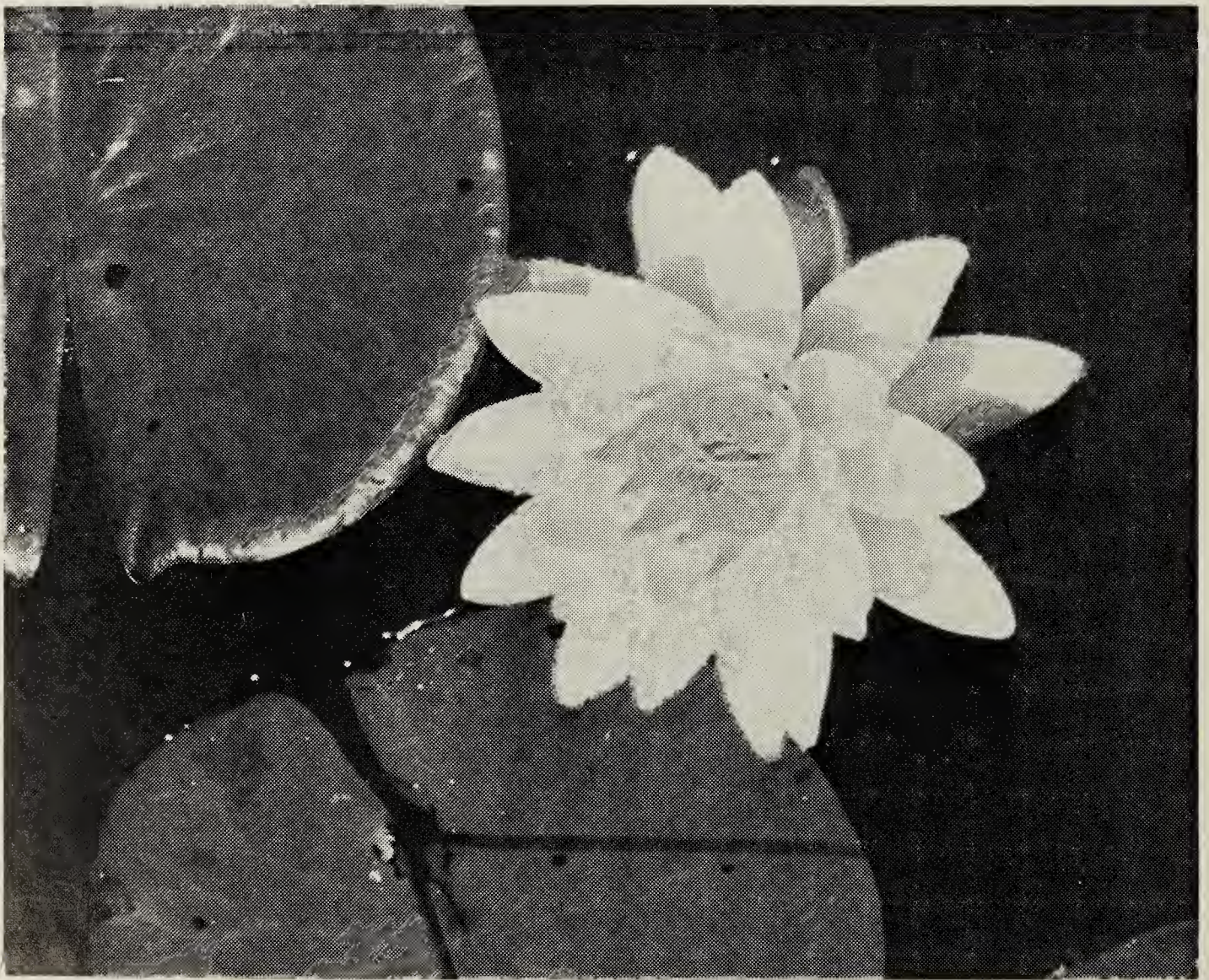
Arnica chamissonis Less. - Leafy Arnica
Arnica fulgens Pursh - Shining Arnica
Artemisia biennis Willd. - Biennial Wormwood
Artemisia cana Pursh - Hoary Sagebrush
Artemisia frigida Willd. - Pasture Sage
Artemisia ludoviciana Nutt. var. *gnaphalodes* (Nutt.) T. & G. - Prairie Sage
Aster ericoides L. ssp. *pansus* (Blake) A.G. Jones) Many-flowered Aster
Aster hesperius A. Gray - Willow Aster
Aster laevis L. - Smooth Aster
Carduus nutans L. - Nodding Thistle
Cirsium arvense (L.) Scop. - Canada Thistle
Cirsium flodmanii (Rydb.) Arthur - Flodman's Thistle
Crepis tectorum L. - Narrow-leaved Hawk's-beard
Erigeron asper Nutt. - Rough Fleabane
Erigeron caespitosus Nutt. - Tufted Fleabane
Erigeron canadensis L. - Canada Fleabane
Erigeron glabellus Nutt. - Smooth Fleabane
Gaillardia aristata Pursh - Great-flowered Gaillardia
Grindelia squarrosa (Pursh) Dunal - Gumweed
Gutierrezia sarothrae (Pursh) Britt. & Rusby - Common Broomweed
Helenium autumnale L. var. *montanum* (Nutt.) Fern. - Mountain Sneezeweed
Helianthus subrhomboideus Rydb. - Beautiful Sunflower
Heterotheca villosa (Pursh) Shinnars var. *villosa*) Hairy Golden-aster
Hieracium umbellatum L. - Canada Hawkweed
Lactuca pulchella (Pursh) DC. - Blue Lettuce
Liatris punctata Hook. - Dotted Blazingstar
Lygodesmia juncea (Pursh) D. Don - Skeletonweed
Prenanthes racemosa Michx. - Glaucous White Lettuce
Ratibida columnifera (Nutt.) Woot. & Standl. - Long-headed Coneflower
Senecio canus Hook. - Silvery Groundsel
Solidago canadensis L. var. *gilvocanescens* Rydb. - Canada Goldenrod
Solidago missouriensis Nutt. - Low Goldenrod
Solidago rigida L. var. *humilis* - Stiff Goldenrod
Solidago spathulata DC. var. *spathulata* - Mountain Goldenrod
Sonchus arvensis L. - Perennial Sow-thistle
Taraxacum officinale Weber - Dandelion
Tragopogon dubius Scop. - Yellow Goat's-beard

A NEW LOCALITY FOR THE FRAGRANT WATER LILY IN MANITOBA

LEONARD J. HUTCHISON, Department of Botany, University of Toronto, Toronto, Ontario. M5S 1A1

Southeastern Manitoba is at the western extremity of the Great Lakes-St. Lawrence forest region in Canada.² It is in this area that there are many plant species which are not generally found in the rest of the prairie provinces. Woody species such as the Eastern White Pine (*Pinus strobus*), Red Pine (*P. resinosa*), Ground Hemlock (*Taxus canadensis*) and Horn Hopbeam (*Ostrya virginiana*) can

be found here in addition to herbaceous species such as Wild Ginger (*Asarum canadense*), Jack-in-the-Pulpit (*Arisaema triphyllum*) and the Sensitive Fern (*Onoclea sensibilis*). While many of the plants in this forest region are common throughout their range in eastern North America, a few are considered to be locally rare in Manitoba. One such plant is the Fragrant Water Lily (*Nymphaea odorata*).⁴



Fragrant Water Lily found in Nopiming Provincial Park

The two published floras for the province, as well as a herbarium search (Table 1.) have shown that this attractive plant has until now been found only in Whiteshell Provincial Park and its vicinity in southeastern Manitoba.¹⁻³ An exception is a single record for a specimen collected north of Lake Winnipeg. Recently I had the opportunity to collect this species near Black Lake in Nopiming Provincial Park, which is situated east of Lake Winnipeg and north of Whiteshell P.P. along the Manitoba-Ontario boundary. The collection represents a new locality record for the province.

In the small lakes where this water lily was found growing, it only colonized shallow bays with rocky or sandy bottoms. The more common Small Water Lily (*Nymphaea tetragona* ssp. *leibergii*) and the Yellow Pond Lily (*Nuphar variegatum*) were also found in this region but appeared to be restricted to slow moving streams and shallow bays with muddy bottoms. Since Manitoba has not been systematically botanised over the years, large gaps exist in our

knowledge of plant species distribution. With increased observations and collecting by amateur and professional botanists alike, many plants such as the Fragrant Water Lily may be found to have more extensive distributions within the province. Ultimately, the possibility exists that some of these species may be removed from the list of rare vascular plants for Manitoba.

I would like to thank R.J. Staniforth, G.M. Keleher and K.L. Johnson for access to plant collections, and R.C. Summerbell for reviewing the manuscript.

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²ROWE, J.S. 1972. Forest regions of Canada. Can. For. Serv. Publ. No. 1300, Ottawa.

³SCOGGAN, H.J. 1957. Flora of Manitoba. Nat. Mus. of Canada Bull. No. 140, Ottawa.

⁴WHITE, D.J. and K.L. JOHNSON 1980. The rare vascular plants of Manitoba. Nat. Mus. of Nat. Sci. *Syllogeus* No. 27, Ottawa.

Table 1. COLLECTIONS OF FRAGRANT WATER LILY IN MANITOBA HERBARIA

<i>Location</i>	<i>Collector and Date</i>	<i>Specimen*</i>
1) Shoal Lake	C.W. Lowe, July 1920	WIN 2755
	C.W. Lowe, July 1920	WIN 2756
2) Whiteshell P.P. (West Hawk Lake)	Mrs.A. Simpson, July 1956	MMMN 758
(Caddy Lake)	Mrs.A. Simpson, 18 Aug.1934	MMMN 755
(Lily Pond Lake)	B. Boivin, 26 June 1959	WIN 2758
	S. McInnes, 13 July 1973	MMMN 2866,2868
	K. Essenberg, 12 July 1977	UWPG 0608
	J.D. Johnson, 22 June 1983	MMMN 13289
3) Lac du Bois	G.M. Keleher, 18 Aug. 1982	WIN 38297
4) Nopiming P.P. (near Black Lake)	L.J. Hutchison, 10 July 1986	WIN 42909
5) Minago River, near Hill Lake	H.J. Scoggan, 17 July 1948	WIN 2757
(North of Lake Winnipeg)		

* WIN = Herbarium of the Univ. of Manitoba; MMMN = Herbarium of the Manitoba Mus. of Man and Nature; UWPG = Herbarium of the Univ. of Winnipeg

BLACK-EYED SUSAN DEFORMITIES

ANTHONY J. HRUSKA, P.O. Box 38, Gerald, Saskatchewan. S0A 1B0

Black-eyed Susans (*Rudbeckia hirta* L.) which grow in our wild flower garden section have produced some very unusual aberrations this year. These flowers have been growing here for a number of years. The severe mutations (?) were a surprise as none of the plants showed any signs of deformity in previous years. The astonishment came in the fact that so many stems were deformed. All flowers on the affected stems were likewise fused and deformed as can be seen in the illustrations.

The most striking deformities are the four-stem fusions (Fig. 2, 3). Figure 3

shows the various types of deformity and their mode of attachment on the affected stems.

Aberrations and deformities are found in all plants and animals. They generate an interest only in so far as to make you wonder what will follow. Was this a genetic aberration that popped up as a recessive trait, or was it the result of man's use of highly potent chemicals in the area.

HRUSKA, A.J. 1963 Unusual Black-eyed Susan. *Blue Jay* 21(1):30.



Figure 1.



Figure 2.



Figure 3.

Photos by Gerald Petras

ADDITIONAL WILDLIFE OBSERVATIONS ALONG THE SOURIS RIVER, MAY 1985

DONALD A. WEIDL, Box 607, Birch Hills, Saskatchewan. S0J 0G0

In the December 1985 issue of the Blue Jay the author summarised wildlife observations along the Souris River during three canoe trips; 1978, 1979, 1980. On 18-19 May 1985 Douglas Boivin, Terry Toews, Barb Weidl and the author returned to canoe part of the Souris River in the Oxbow area. On 18 May the party canoed 14 km downstream from Bow Valley Regional Park. On 19 May the canoes were launched at a point 8 km upstream from Bow Valley Regional Park with the day trip terminating at the park. The weather was clear on both days with temperatures ranging from +10°C to +23°C and winds west at 20-30 kmph.

A small dam downstream from the regional park provided sufficient water

for the trip above the park on 19 May. Water levels downstream from the park were low but no major hazards, except the dam, were encountered. Lush tree cover along the river banks again provided good habitat for birds and other species of wildlife.

Muskrat, mink, Beaver, Raccoon, Coyote, Woodchuck and White-tailed Deer were observed. No Fox Squirrels were seen during the 1985 outing. A total of 94 Western Painted Turtles were seen over the two days. Two Common Snapping Turtles were seen on 19 May, upstream from Bow Valley Regional Park. Again these turtles were very shy and it was only after a 30-minute wait that they briefly emerged, allowing a second look.



Female Common Yellow Throat

Andrius Valadka

Altogether 77 bird species were observed during the two-day outing. This included birds seen along the immediate river bank as well as from some of the upper regions of the river valley. Of these, 14 were new species for our "all time list," making a total of 102 bird species recorded along the Souris River by the author. Table 1 lists the birds

observed during the 1985 outing.

The author and members of the canoe trip were again impressed by the diversity of wildlife along the Souris River. If weather and time permit a fifth canoe trip is planned along a different section of the Souris River next spring.

Table 1. BIRD SPECIES OBSERVED ALONG THE SOURIS RIVER, 18-19 MAY 1985.

<i>Species</i>	<i># Seen</i>	<i>Species</i>	<i># Seen</i>
*Double-crested Cormorant	2	Bank Swallow	6
Great Blue Heron	4	Cliff Swallow	500 +
Wood Duck	4 pair	Barn Swallow	+
Mallard	10 pair	Blue Jay	6
Northern Pintail	1 pair	Black-billed Magpie	8
Blue-winged Teal	4 pair	American Crow	3
Northern Shoveler	1	Black-capped Chickadee	6
American Widgeon	3 pair	*White-breasted Nuthatch	2
*Canvasback	1 female injured	House Wren	+
		*Eastern Bluebird	1 male
*Lesser Scaup	1 pair	*Gray-cheeked Thrush	1
Northern Harrier	1	*Swainson's Thrush	4
Cooper's Hawk	1	American Robin	+
Swainson's Hawk	5	Brown Thrasher	1
Red-tailed Hawk	2	Cedar Waxwing	2
*American Coot	1	Warbling Vireo	3
Killdeer	+	*Tennessee Warbler	8
Solitary Sandpiper	1	*Orange-crowned Warbler	1
Willet	1	Yellow Warbler	+
Spotted Sandpiper	+	*Blackpoll Warbler	1
Upland Sandpiper	1	Black-and-white Warbler	1
Franklin's Gull	5	American Redstart	3
Black Tern	1	Northern Waterthrush	4
Mourning Dove	+	Common Yellowthroat	2
Great Horned Owl	4	Rose-breasted Grosbeak	+
Belted Kingfisher	+	Rufous-sided Towhee	2
*Yellow-bellied Sapsucker	6	Chipping Sparrow	+
Downy Woodpecker	2	Clay-colored Sparrow	+
Hairy Woodpecker	2	Vesper Sparrow	6
Northern Flicker	2	Song Sparrow	5
*Olive-sided Flycatcher	1	Bobolink	7
Western Wood-Pewee	1	Red-winged Blackbird	6
Least Flycatcher	+	Western Meadowlark	2
Western Kingbird	2	Brewer's Blackbird	2
Eastern Kingbird	1	Common Grackle	6
Horned Lark	+	Brown-headed Cowbird	+
*Purple Martin	+	Northern Oriole	+
Tree Swallow	6	American Goldfinch	+
N. Rough-winged Swallow	+	House Sparrow	+

* = species added to our "all time list."

+ = more than 10 individuals seen over the two days.

OBSERVATIONS OF AN AMERICAN WOODCOCK NEST AND EGG DATES IN MANITOBA

MICHAEL MONKMAN, Box 48, Richer, Manitoba. R0E 1S0

I have been fortunate to see three active American Woodcock nests; two, found in our yard near Richer by my father and me, respectively, have previously been reported.² The third nest, containing a full clutch of four eggs, was found 23 April 1986 by John Kaluzny and Wayne Kupiak while clearing out some trees in the Department of Natural Resources compound at Hadashville. I first visited the site and identified the bird on 26 April. The nest was about 6.5 m (20 feet) from the edge of a graveled parking area in a grassy site surrounded by Red-osier Dogwood and Trembling Aspen with a few scattered small White Spruce. It had been fairly wet and there was still a small pool of water close to the nest.

Inasmuch as I work for the Department I was able to visit the nest frequently. On 27 April I took numerous color photos of the incubating bird and the nest and its contents. Later that day Bob Nero inspected the site. When he touched the incubating bird she scurried off, giving distraction display, tail fanned out and wings dragging. The morning of 28 April was cold after a lot of snow and rain so I made no attempt to flush the incubating bird. On 29 April I went to check the nest at 1131 h. I approached the nest and then put my hand next to the bird but she did not flush, so I left her.

In the afternoon of 29 April the sun was out so I thought I could safely check the eggs. I again put my hand beside the incubating bird, then touched her on the wing, but she did not leave. Finally I

stroked her back and then she darted away about 3 m (10 feet) with distraction display. There were still four eggs. I next checked the nest on 2 May at 0740 h and took twenty black and white photos of the incubating bird at different angles. I visited the nest again twice in the afternoon. I noticed that the incubating bird seemed to always keep her back to the sun; that was the case every time I was at the nest. No one else seems to have observed this interesting behavior (pers. comm., R.W. Nero).

On 8 May at 0740 h the eggs had still not hatched. The next day, however, at 0754h I found that all four eggs had hatched. Only one of the four chicks was out of the nest; I guessed that the eggs had hatched about 3 hours earlier. Usually one egg is laid per day and the incubation period for Woodcock is 20-21 days.¹ ⁴ Thus, this clutch must have been laid about 16-19 April in cold weather.

A nest with three eggs was found by Harold C. Tirschman 8 May 1986 on his property about 6.4 km (4 mi.) east of Steinbach. The nest still contained three eggs 9 May, but on 11 May there were four eggs, giving egg-laying dates of about 6-11 May. On 30 May, three eggs hatched, but there was no sign of the fourth egg (pers. comm., H.C. Tirschman to R.W. Nero). Tirschman reported that he had seen two or three broods annually for the past several years on the same property. Other egg-laying dates for extreme southeastern Manitoba are: 20 April 1970 (egg on top of fresh snow, Piney)², 1-4 May 1979 and 11-14 April



1981 (both at Richer).³ These limited records show that egg-laying dates for the Woodcock in Manitoba are from mid-April to mid-May. In most of its breeding range eggs are laid in April, but occasionally it lays in March as far north as Michigan and Massachusetts.³

A late nest with four eggs was found by Paul E. Long and William D. Leitch near Snake Lake, west of Waugh, Manitoba (south of Falcon Lake) 22 May 1985. Females often renest after losing their eggs. The nest was discovered when the female flushed from it (pers. comm., W.G. Leitch to R.W. Nero). This nest was in a dry site in sedge and grass on the edge of willows.

I would like to thank Robert W. Nero for helping me prepare these observations for publication.

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³NERO, R.W. 1981. Additional American Woodcock notes for Manitoba. *Blue Jay* 39:202-205.

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RUBY-THROATED HUMMINGBIRD ASSOCIATING WITH A FORAGING HAIRY WOODPECKER

SPENCER G. SEALY, Department of Zoology, University of Manitoba, Winnipeg, Manitoba. R3T 2N2

On 20 May 1983 a female Hairy Woodpecker was observed foraging on the trunk of a Green Ash on the forested dune ridge, about 5 km west of Delta, Manitoba. A male Ruby-throated Hummingbird flew to within a few cm of the woodpecker then withdrew until it was about 2 m away and hovered. It repeated this sequence three more times over the next minute or so. The woodpecker then moved abruptly toward the hummingbird, by sidling on a branch. The hummingbird flew to and perched on a branch in the same tree, about 3 m from the woodpecker. A few seconds later, the woodpecker chased the hummingbird out of my sight. I did not see the woodpecker or hummingbird again at the woodpecker's original foraging site.

Numerous workers have reported hummingbirds feeding on sap from holes drilled by Yellow-bellied Sapsuckers at northern latitudes,^{1 7 9} and in the tropics at holes drilled by Acorn Woodpeckers.² Evidence is mounting that hummingbirds actually associate with sapsuckers,⁵ and that Ruby-throated Hummingbirds may follow them as they forage, thus facilitating locating drilled holes where sap may be obtained.³

The association between the Ruby-throated Hummingbird and Hairy Woodpecker that I described raises some interesting questions. Was this association merely coincidental? Ruby-throated Hummingbirds occur in the dune-ridge forest during spring migration (Sealy, unpubl. data), and I have observed such individuals foraging on leaf buds, including

those of Green Ash, possibly ingesting exudate or insects that have become entangled in it. The hummingbird and woodpecker may have just come together in the same tree, and the described interactions ensued.⁴ On the other hand, the hummingbird may have associated the woodpecker's foraging mode with a possible source of food, regardless of whether the woodpecker was a sapsucker, or it possibly mistook the foraging Hairy Woodpecker for a sapsucker, a bird about the same size, and investigated it. Hummingbirds are known to investigate various colors, including red,^{6 8 10} and they might be expected occasionally to cue into the red patch on the back of the head of male Hairy Woodpeckers. However, female Hairy Woodpeckers lack the patch of red feathers.

Acknowledgments

This observation was made while I conducted studies of passerine reproductive biology on the forested dune ridge, Delta Marsh, Manitoba. Keith A. Hobson read an early draft of the manuscript and pointed out a couple of pertinent references. This work was funded by grants from the Natural Sciences and Engineering Research Council of Canada. This contribution is number 123 of the University of Manitoba Field Station (Delta Marsh).

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⁴KATTAN, G. and C. MURCIA. 1985. Hum-

mingbird association with Acorn Woodpecker sap trees in Colombia. *Condor* 87:542-543.

³KNAPTON, R.W., R.V. CARTER and J.D. REYNOLDS. 1985. Do hummingbirds follow sapsuckers to food sources? *Blue Jay* 43:186-187.

⁴MARLER, P. 1956. Studies of fighting in Chaffinches (3) *Proximity* as a cause of aggression. *Br. J. Anim. Behav.* 4:23-30.

⁵MILLER, R.S. and R.W. NERO. 1983. Hummingbird-sapsucker associations in northern climates. *Can. J. Zool.* 61:1540-1546.

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⁷SOUTHWICK, E.E. and A.K. SOUTHWICK. 1980. Energetics of feeding on tree sap by Ruby-throated Hummingbirds in Michigan. *Amer. Midl. Nat.* 104:328-334.

⁸STILES, F.G. 1976. Taste preferences, color preferences, and flower choice in hummingbirds. *Condor* 78:10-26.

⁹SUTHERLAND, G.D., G.L. GASS, P.A. THOMPSON and K.P. LERTZMAN. 1982. Feeding territoriality in migrant Rufous Hummingbirds: defense of Yellow-bellied Sapsucker (*Sphyrapicus varius*) feeding sites. *Can. J. Zool.* 60:2046-2050.

¹⁰WELKER, H.J. 1984. Food color preference in the Anna's Hummingbird. *West. Birds* 15:23-27.

Fred W. Lahrman



Northern Lights

Fred W. Lahrman

SEX RATIOS OF BIRDS KILLED IN ONE NIGHT DURING SPRING MIGRATION IN MANITOBA, SPRING 1983

SPENCER G. SEALY, Department of Zoology, University of Manitoba, Winnipeg, Manitoba. R3T 2N2

Analyses of migrating birds killed at night in collision with tall, lighted structures, either on single nights or over entire migration periods, have contributed to our understanding of many aspects of avian migration.^{1 2 4 9 10} Large, single samples of birds so killed during the spring migration have been reported infrequently, especially in western Canada.⁵ About 150 passerine birds were killed during inclement weather on 22

May 1974 when they struck a glass wall that joins two apartment blocks in Winnipeg, Manitoba. Most of the birds in that sample were Tennessee Warblers, and I reported on them elsewhere.⁷ At the same apartment block, during the night of 19-20 May 1983, 120 passerine birds and one hummingbird were killed. These specimens are analyzed in the present report.

Table 1. SPECIES AND SEX RATIOS OF BIRDS WINDOW-KILLED ON THE NIGHT OF 19/20 MAY 1983, WINNIPEG, MANITOBA.

<i>Species</i>	<i>Number in sample</i>	<i>% of sample</i>	<i>% males</i>
Ruby-throated Hummingbird	1	0.8	100.0
Least Flycatcher	4 ^a	3.3	50.0
Gray-cheeked Thrush	1	0.8	0.0
Swainson's Thrush	6	5.0	66.7
Tennessee Warbler	14	11.6	85.7
Orange-crowned Warbler	6	5.0	0.0
Nashville Warbler	5	4.1	100.0
Yellow Warbler	2	1.7	50.0
Cape May Warbler	2	1.7	50.0
Yellow-rumped Warbler	30	24.8	50.0
Palm Warbler	15	12.4	33.3
Blackpoll Warbler	2	1.7	100.0
Black-and-white Warbler	9	7.4	0.0
American Redstart	2	1.7	100.0
Ovenbird	15	12.4	40.0
Northern Waterthrush	1	0.8	100.0
Common Yellowthroat	1	0.8	100.0
Wilson's Warbler	1	0.8	100.0
Chipping Sparrow	3	2.5	33.3
White-throated Sparrow	1	0.8	0.0
Totals	121	101.1	

^aThe Least Flycatchers were retained as voucher specimens (University of Manitoba Zoology Museum numbers 2372-5).

The specimens, salvaged by Daniel M. Guinan on the morning of 20 May 1983 following several days of below-normal temperatures in southern Manitoba,¹¹ were bagged, frozen, and later identified and sexed by dissection.

The sample contained 121 birds of 21 species, consisting of 1 hummingbird and 20 species of passerines (Table 1). The sample is dominated (61.2% of total number of individuals) by four of the most abundant species of warblers that migrate in spring through southern Manitoba — Tennessee, Yellow-rumped and Palm warblers, and Ovenbird.⁸ Of these four species, females predominated in the Palm Warbler (67%) and Ovenbird (60%), males dominated the Tennessee Warbler (86%) and both sexes occurred equally in the Yellow-rumped Warbler. Interestingly, males comprised 71.8% of the 71 Tennessee Warblers in the sample salvaged in May 1974.⁷

In a study of the spring migration patterns of 18 species of wood warblers (Parulinae) in Ontario, Francis and Cooke showed that males arrived earlier than females in all species.³ They found also that the difference in the mean arrival dates between the sexes was greatest in the species which arrived earliest. There is a hint of the segregation of sexes in the small sample of birds killed in late May, 1983, in Manitoba. Of the four species which arrive earliest in spring in central Manitoba, all of the Orange-crowned and Black-and-white warblers killed were females, two-thirds of the Palm Warblers were females, but only half of the Yellow-rumped Warblers were females. All of the five Nashville Warblers, a later migrant, were males. The date these birds were killed coincided with the latter part of the migration period of these species.^{6 8}

Acknowledgments

Daniel M. Guinan salvaged the specimens upon which this report is based. Keith A. Hobson commented on a draft of the manuscript.

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- ¹⁰ TORDOFF, H.B. and R.M. MENGEL. 1956. Studies of birds killed in nocturnal migration. *Univ. Kansas Publ., Mus. Nat. Hist.* 10:1-44.
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Duck Mountain Provincial Park Nature Centre.

R.J. Long

GOLDEN-WINGED WARBLER AT DUCK MOUNTAIN, SASKATCHEWAN

STAN SHADICK, 3F-1800 Main Street, Saskatoon, Saskatchewan. S7H 4B3

I am one of those who finds observing warblers to be the epitome of birdwatching. It is true, these tiny birds present a challenge to the birder because of their flirtive behavior - often flying out of sight in the woods as soon as they are spotted on an exposed perch. Nevertheless, if

one is persistent and quick, the view of their bold colourful plumages is a just reward. As a group they must surely display nature's artistry at its best.

In the Saskatoon district warbler watching is primarily restricted to August and

early September when mainly dull-plumaged birds may be found in our city parks and residential areas. During spring migration only a few species are in abundance - primarily Yellow-rumped, Orange-crowned, Tennessee and Yellow Warblers.

In order to seek out a wider variety of warblers, one must travel to their nesting grounds in the transition zone from aspen parkland to boreal forest. With this in mind, I joined a group of Saskatoon Natural History Society members who visited Duck Mountain Provincial Park 28-30 May 1986 while en route to the Yorkton Spring Meet.

I was fascinated by the brilliant orange-faced Blackburnian Warblers which were one of the most abundant warblers in the park. Nashville Warblers were also quite common which surprised me as I have found them to be extremely rare elsewhere in the province.

On 29 May our group had spent the morning birding along the road to Little Boggy Creek near the south park boundary. As we drove up a steep hill, only 2 km from Manitoba, I heard a different buzzy song - BIZZ, BUZZ, BUZZ, BUZZ, BUZZ. I recognized this song to be that of a Golden-winged Warbler, a bird I had previously known from southern Ontario. As I tramped through the woods, the bird flew to a dead branch where it sat showing off its yellow crown, black face, white belly and yellow patch on its grey wings. The bird continued to sing from this spot for 15 minutes while it was also observed by Mary Gilliland, Jim &

Vivian Slimmon, Paul & Vi Coutu, Ron & Muriel Bremner, Alvena Schnell, Phil & Monique Thair, Marie Gillespie, Jean Anderson, Pern Cordery and Frank Roy.

The next morning we returned to the spot in hopes of showing the bird to Bernie and Win Anderson. Sure enough! It was still there singing from the same dead branch. In fact, it sat there long enough for us to observe it with a spotting scope.

The bird continued to sing from the same territory throughout the first half of June where it was observed on frequent occasions by Nigel Caulkett, the park naturalist and other visiting birders.

Golden-winged Warblers have been reported from nearby Riding Mountain National Park in Manitoba for several years.³ This sighting is the first record for Duck Mountain Provincial Park and only the fifth published record for Saskatchewan. Previous Saskatchewan records include sightings in Regina 18 May 1962, 2 June 1968 and 1 October 1972; as well as a sighting in the Porcupine Hills, 45 km east of Hudson Bay, 17 June, 1984.^{1 2} The Duck Mountain sighting is the only case where a bird was observed on the same territory for more than one day.

¹BELCHER, M. 1980. Birds of Regina. Sask. Nat. Hist. Soc., Spec. Publ. 12. p. 106.

²GOLLOP, J.B. 1984. Prairie Provinces Region. *Am. Birds* 38:1031.

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POSSIBLE LESSER BLACK-BACKED GULLS AT MOOSE JAW, SASKATCHEWAN

FRANK BRAZIER, 2657 Cameron Street, Regina, Saskatchewan. S4T 2W5

On 13 April 1986, about 3:00 p.m., I was alone, driving somewhat slowly (ca 40 kph) about 10 miles west of Moose Jaw on Highway 1 (Trans-Canada). The traffic was heavy and the weather poor - overcast but the snowfall of the previous night and morning had stopped. There were numerous Ring-billed Gulls along the road.

I noticed a gull (Ring-billed size) standing at the edge of the field across the north ditch. It was probably less than 50 feet away. It was facing me with its head down and at the same time another similar-sized gull flew to it; the first bird then raised its head. The second gull landed for an instant and both took off flying north for a few feet. Both banked sharply to the east for a short distance and then headed south, all the while about 6 feet above the ground. When they banked I had a good view of the entire mantle and wings of both birds, both being solid black from wingtip to wingtip except for the narrow white trailing edges of the wings. I could also see that both bills were yellow. I could not detect any other field marks but the size and solid black mantles and wings with yellow bills were sufficient to identify them as Lesser Black-backed Gulls.

When I reported Saskatchewan's first sight record of a Lesser Black-backed Gull, seen on 28 May 1977 at Regina by Marjie Brazier and me, I noted that there are only five similar black-backed gulls.² We can rule out the Great Black-backed Gull because of its enormous size, also the Southern Black-backed Gull, as it is confined to the Southern Hemisphere, the Slaty-backed Gull, as it is found only

in N.E. Asia - Alaskan Coast, the Western Gull as it is confined to the Pacific Coast of North America, but the Lesser Black-backed Gull is an uncommon, although increasing, regular migrant in eastern North America. Scott now considers it "...casual to uncommon but increasing on Atlantic coast, casual throughout the east."⁵ Goodwin for Niagara Falls, Ontario notes they "...have been seen with increasing frequency in recent years."⁴ Holshan and Koes report Manitoba's 2nd and 3rd sighting - at Winnipeg, May and June, 1984, respectively.³

I mentioned that the Lesser Black-backed Gull has been a regular Atlantic coast visitor since 1934 and that Canada's first record occurred 5 June, 1968 in the Arctic.² A review of the pages of *American Birds* reveals that a good number of these gulls pass the winter on the Atlantic seaboard and Gulf of Mexico coast. The Autumn 1984 issue notes at least 65 birds, mostly along the Atlantic coast, on the Gulf coast, but 26 on the Great Lakes including Minnesota's first record. Weir reports 25 birds in Ontario and reasonably conjectures that the two first-winter birds at Long Point supports "... the hypothesis that the species may be nesting in North America."⁶ Boyle *et.al.*, for the Hudson-Delaware Region, remarks that sightings are now so frequent that some observers do not bother to mention them.¹

There were 73 + birds counted in the winter 1984-1985, 58 + being along the Atlantic Coast. The following spring had 39 reported, 20 of them in Ontario, while the autumn migration issue (1985) once again reports 65 + birds. Most of these,

55 + , were Atlantic coast sightings and 10 were Gulf of Mexico birds.

When we consider the vast flocks of Ring-billed and Herring Gulls that overwinter in the milder Atlantic and Gulf coasts it is likely that they bring with them the occasional Lesser Black-backed Gull when migrating in the spring. If the two I saw were a mated pair perhaps they will settle somewhere in northern North America which has yet to have its first nesting of this species.

¹BOYLE, W.J., JR., R.O. PAXTON, and D.A. CUTLER 1985. Hudson-Delaware Region. *Am. Birds* 39: 150-154.

²BRAZIER, F. 1977. Probable Lesser Black-backed Gull at Regina. *Blue Jay* 35:257-258.

³COLLOP, J.B. 1984. Prairie Provinces Region. *Am. Birds* 38:1031-1033.

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⁵SCOTT, S.L. (Ed.) 1983. Field guide to the birds of North America. Nat. Geog. Soc., Washington. 463 pp.

⁶WEIR, R.D. 1985. Ontario Region. *Am Birds* 38:46-50.

EDITOR'S NOTE: While most birdwatchers do it, identifying a bird, particularly a rarity, based on its geographical distribution cannot be considered an adequate determination. Unfortunately, in this as in many other cases, viewing conditions do not permit observation of the sometimes minute details required to make the identification conclusive.



Turkey Vulture

Fred W. Lahrman

THE MUSCLE OF BIRD FLIGHT: STRUCTURE AND FUNCTION

BENJAMIN W.C. ROSSER, Department of Anatomy, University of Maryland, Baltimore, Maryland, U.S.A. 21201

A Turkey Vulture soars in the summer sky, high above the Qu'Appelle Valley. Its outstretched wings are held almost motionless against the air currents rising from below. A Canada Goose, by comparison, will beat its wings 3-5 times/second while flying 2000 km from northern Missouri to the Hudson Bay Lowlands. After this journey of over half a million (estimated) wing beats, female geese will obtain protein for the formation of eggs from the atrophy of their major flight muscles. House Sparrows tumble over one another for a crust of bread in sub-zero Edmonton. The biochemistry of their muscles has been altered to generate more heat during the winter. Primarily one muscle, the pectoralis (breast muscle), is responsible for these varied activities. In each case, the muscle is uniquely adapted to meet the demands of the environment.

Pectoralis Muscle

The pectoralis muscle of birds can function in locomotion, protein storage and heat generation. This muscle is a massive organ which, depending upon the species, can comprise from 7 to 27% of the fresh body weight of a bird.⁶ The pectoralis is present as separate left and right halves (Fig. 1). Each half arises mainly from the keel of the breast bone (sternum), and attaches to the shoulder (humerus) of its respective wing. The muscle provides virtually all of the power for the downstroke of the wing, which is necessary to provide the lift for flapping flight.¹⁰

Muscle Fibers

Countless thousands of muscle fibers make up the avian pectoralis. Muscle

fibers are the microscopic, cylindrical contractile cells of which all striated muscles are composed. There are several types of muscle fibers.⁷ Certain types are specialized for rapid, repeated contraction, and others for slow, individually prolonged contractions. These types are termed fast and slow, respectively. Fast fibers are further differentiated into red, white and intermediate types. Red fibers are comparatively small in diameter, and are specialized for sustained rapid activity. White fibers have larger diameters, and are specialized for brief, powerful bursts of activity. Intermediate fibers are between red and white fibers in their properties and characteristics.

The differences between red and white fibers are biochemical in origin.⁵ Muscle contraction requires energy, which is obtained primarily from two "fuels:" fat and glycogen. Red fibers derive their energy mainly by the metabolism of fat in the presence of oxygen. White fibers use glycogen in the absence of oxygen. Fat is the more efficient fuel, but glycogen can supply energy more quickly.

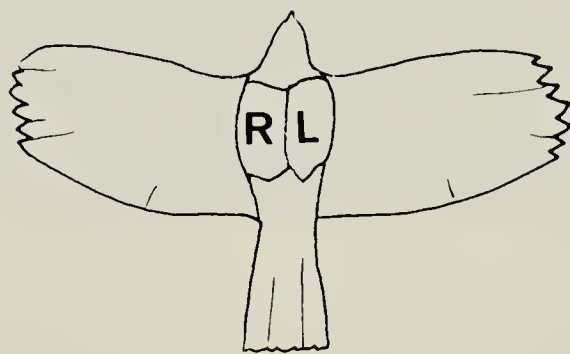


Figure 1. *Ventral view of the left (L) and right (R) pectoralis muscles of a typical bird.*

Glycogen is also rapidly transformed into waste products which inhibit muscle contraction. Consequently, white fibers contract rapidly at first but soon fatigue. The smaller diameter of the red fibers facilitates the diffusion of oxygen into the cells. Also, a difference in colour between red and white fibers is due to the presence of myoglobin (a protein for the transport and storage of oxygen). Red fibers contain much myoglobin and, as a result are dark red in colour; white fibers have little myoglobin and are light-coloured. Muscle fibers impart their colour to the muscle as a whole. The familiar dark meat and light meat of a turkey dinner are largely due to a preponderance of red or white fiber types in the muscles. There are also biochemical differences between fast (red, white and intermediate) and slow fibers; though these differences are in the cell membranes and contractile proteins.^{9 10}

Locomotion: Structure correlates with function

The mode of flight exhibited by any species of bird is related to the type of muscle fibers found in the pectoralis. Flapping flight requires rapid, repeated contractions of the pectoralis muscle. The muscle consists exclusively (99-100%) of fast fiber types in all of those species

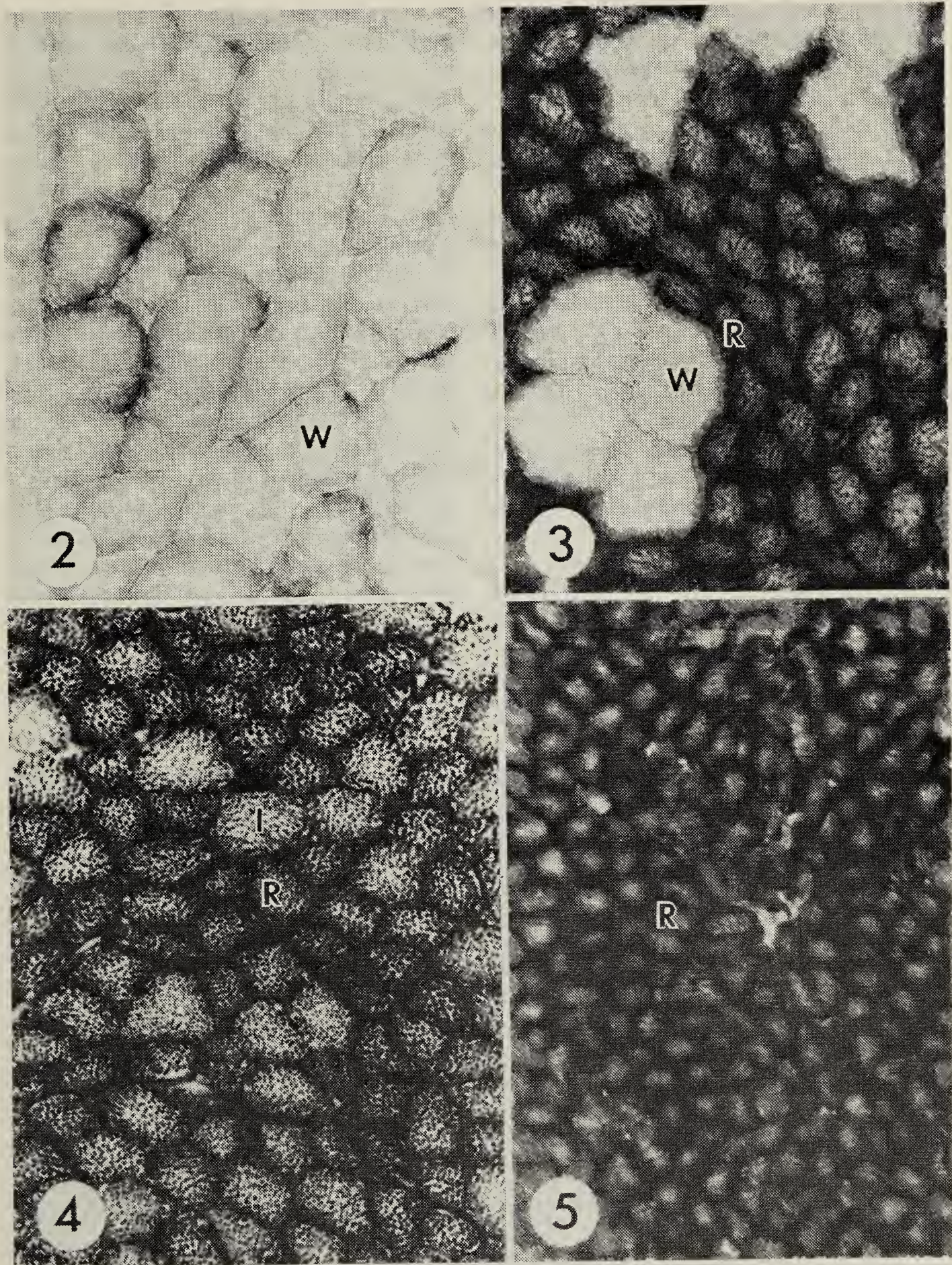
studied which employ flapping flight.¹⁴ Slow fibers do occur in relatively large numbers, however, in the pectoralis of those birds most adept at soaring flight, such as the Turkey vulture.¹⁵ These fibers are apparently used for maintaining the wings in an outstretched position against wind resistance. Slow prolonged contractions are well suited to such a function. Some slow fibers also occur in the pectoralis of the Ostrich, Emu and Kiwi.¹³ This may be a result of flightlessness in these birds, and underscores the demands that flapping flight places upon the muscles.

Birds such as the Ruffed Grouse, which are specialized for explosive flight of short duration, have a pectoralis muscle consisting almost entirely of white and intermediate fiber types (Fig. 2). The pectoralis of these species appears whitish, as it does in the Domestic Chicken. The muscle, however, consists mainly of red fibers in most species (see Table 1.), and is dark red in colour due to the high myoglobin content. The Domestic Pigeon, for example, has red and white fibers (Fig. 3), and the Yellow-headed Blackbird red and intermediate fiber types (Fig. 4). The muscle consists entirely of red fibers in most small passerines, such as the Red Crossbill (Fig. 5).

Table 1. EXAMPLES OF FIBER TYPES IN THE AVIAN PECTORALIS MUSCLE.

<i>Species</i>	<i>Fiber Type*</i>
Ruffed Grouse	WIR
Great Horned Owl	IR
Mallard	RW
Domestic Pigeon	RW
Northern Harrier	RI
European Starling	RI
Black-capped Chickadee	R
House Sparrow	R

* W = white, I = intermediate, R = red.
Fiber types are listed in order of decreasing proportion.¹⁴



Figures 2-5. Cross sections of muscle fibers from the pectoralis muscle of a Ruffed Grouse (Fig. 2), Domestic Pigeon (Fig. 3), Yellow-headed Blackbird (Fig. 4) and Red Crossbill (Fig. 5). Muscle fibers have been stained for succinate dehydrogenase (SDH) activity.¹⁴ SDH is a key enzyme used to metabolize "fuels" (mainly fat) in the presence of oxygen. W = white, I = intermediate, R = red fibers. Magnification 420X.

Take-off is the phase of flight requiring the most power, and large birds have higher power requirements for flight than do smaller birds.¹⁰ Consequently, large-bodied birds capable of rapid, near vertical take-offs, such as herons, geese and dabbling ducks, have a large number of white fibers in their predominantly red pectoralis muscle. These white fibers are undoubtedly used during take-off and other periods of intense activity. Red fibers are sufficient for meeting all of the power requirement of most small birds. Nevertheless, certain small birds, such as shorebirds, are capable of extremely rapid takeoff and ascent. These birds have large numbers of white and/or intermediate fibers in the muscle.

Thermogenesis: heat production

Birds produce heat by shivering when exposed to cold, and as shivering is muscular contraction, the comparatively massive pectoralis plays a major role.⁴ Small passerines, such as the Black-capped Chickadee, are able to sustain shivering for longer periods in the winter than in the summer.³ While glycogen may initially be used for short periods of shivering, winter birds are better able to utilize fat, and fat is the preferred fuel for shivering during this season. Prolonged exposure to cold results in a decrease in the diameter of the red fibers in the pigeon pectoralis, presumably to increase the capacity for fat utilization. It has also been suggested that an alteration of the biochemical pathways may permit the pectoralis muscle of birds to produce heat by nonshivering thermogenesis, still utilizing fat as fuel.⁴

Protein Reserve

Muscles contain large amounts of protein, which can be mobilized during periods of dietary protein deficiency. A muscle not in use will atrophy, and the protein within it can be transported to other regions of the body and used for other purposes. The females of many

species use the protein of the pectoralis muscle for egg formation. This is especially pronounced in northern nesting geese, which begin egg formation before the snow cover has melted and before dietary protein becomes available.¹² Also, during moult, many species of waterfowl have a simultaneous loss of the flight feathers. This renders these birds flightless, with a concomitant loss of protein from the pectoralis. Some of this protein may be used for the growth of the new flight feathers and/or the hypertrophy (enlargement) of the leg muscles.¹² Ptarmigan and other grouse can draw on the protein of the pectoralis during periods of environmental stress.¹⁶ Smaller birds with relatively higher protein demands, such as the House Sparrow, will do so overnight.⁸ The different fiber types in the pectoralis appear to be utilized to an equal extent during these periods.

Muscle, like bone, bill or feather, is exquisitely suited to fulfill the demands upon it. Anatomy, physiology, biochemistry and natural history are beautifully intertwined and are, indeed, different facets of the same life processes.

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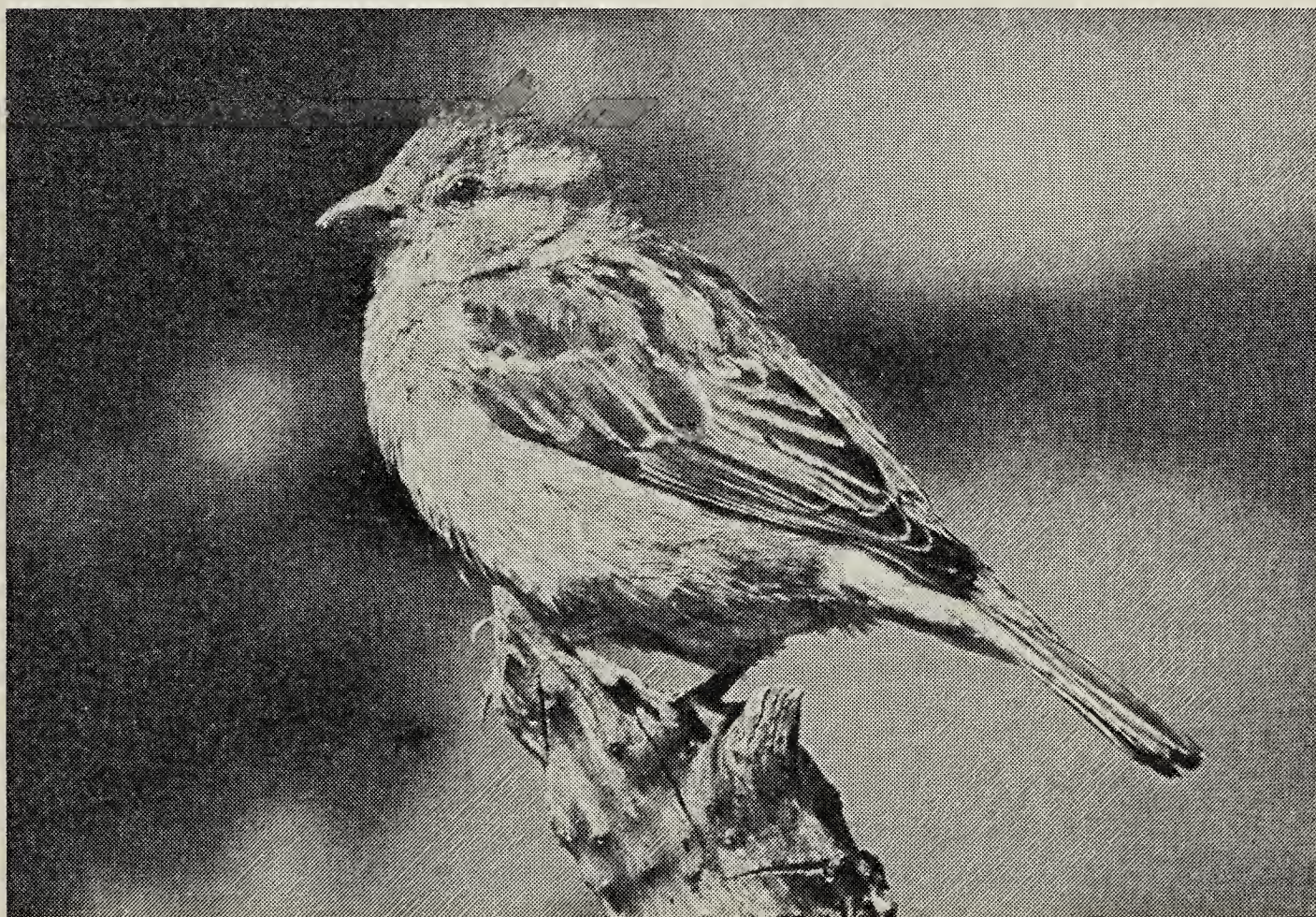
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- ¹⁴ROSSER, B.W.C and J.C. GEORGE 1986a. The avian pectoralis: histochemical characterization and distribution of muscle fiber types. *Can. J. Zool.* 64:1174-1185.
- ¹⁵ROSSER, B.W.C and J.C. GEORGE 1986b. Slow muscle fibers in the pectoralis of the Turkey Vulture (*Cathartes aura*); an adaptation for soaring flight. *Zool. Anz.* (in press).
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House Sparrow

Fred. W. Lahrman

BLUE-RED REACHES THE END OF THE LINE AT NINE*

ERNIE KUYT, 3810-103 B Street, Edmonton, Alberta. T6J 2X9

In early May 1977, in the northeast corner of the Klewi rivermarshes, a tiny whooping crane chick kicked itself out of the shell, its "home" for almost a month. That year was a pretty good year for whoopers in Canada's Wood Buffalo National Park and 10 chicks survived the summer, most of them in the Klewi and Sass marshes and a few scattered elsewhere.

By the end of July when the northeast Klewi chick had reached about three quarters of its parents' size, a small aircraft came droning in from the south. As it reached the area where the whooping crane chick and its parents were feeding, the aircraft began circling at several thousand feet above ground. The cranes only occasionally glanced at the aircraft as it continued to make its lazy loops in the sky. There seemed little concern as the aircraft was well up in the sky and, after all, aircraft were frequently encountered by the birds.

Soon, however, a second noise was heard and a noisy helicopter landed near the birds. Minutes later the chick was caught by men emerging from the machine. The young crane was not hurt and shortly thereafter it was reunited with its parents. Now the chick carried a large blue band and a metal band high up on its left leg and a large red band on its right leg. From then on we knew the crane as "Blue-Red."

In November the three birds safely completed the fall migration to the Aransas National Wildlife Refuge in Texas and we presume the three cranes flew back to Wood Buffalo National Park the

following spring. On 5 June 1978 I saw Blue-Red, then a year old, with an unbanded bird in an area between Sass and Klewi rivers. It was an important sighting because for the first time we knew that yearling whoopers returned to the breeding area and were not, as suggested by some, "summer wanderers," which spend the summers in unknown areas in northern Canada. On 10 June the two birds were in the same area but on 11 July a third bird had joined, also banded (Green-Red) in 1977, and the three birds were again observed a week later.

Blue-Red wintered at Aransas in 1978-1979 and returned north where in May, June and July we saw Blue-Red and Green-Red in the same area as in 1978.

The two birds returned to Aransas in fall 1979 and the following spring (May 1, 3 and 5, 1980) we again encountered our friend Blue-Red. Now, however, the bird had a different companion, again an unbanded bird and also the area was different. Now the two birds were 5-8 km north of the northernmost nest (in the Nyarling area). It was tempting to think that the cranes were scouting out a new area and could return here in 1981 to nest.

The cranes however, did not return here in 1981 or at least we did not see them. Nor did we see them anywhere else in summer 1981. The following year Blue-Red and an unbanded bird were spotted on 10 and 20 May, again in the Nyarling area. This was encouraging for earlier we had learned (from observations of other banded birds) that males could successfully breed at four years of age.

* Reprinted from Nature Society News, Griggsville, Illinois. 62340 July 1986:14.

To our disappointment the birds moved in May or June and on 16 June we saw them once more in WBNP, now back in the south end of the "non-breeder" area, an area so called because I had never found nests here.

That fall, on 23 September I saw Blue-Red and an unbanded bird on Pelican Lake in southern Saskatchewan. It seemed very much that our former Klewichick had formed a pair bond with another bird and was wintering, summering and migrating with that bird. Studies at Aransas showed Blue-Red was most likely a male.

The following year, 1983, began disappointingly because we did not find Blue-Red during the breeding season. But on 4 August, 1983, after the banding of young cranes had been completed, we sighted a family group with a single chick in the south end of the "non-breeder" area. Clearly this was a pair whose nesting activities had been undetected by us in 1983 — always a possibility in the vastness of WBNP. As we circled the three birds to get a better look at the chick we noted with pleasure that one of the adults was Blue-Red; its mate was unbanded.

In 1984 we did find their nest and removed one of the two eggs for shipment to Grays Lake National Wildlife Refuge in Idaho. The egg hatched but the egg left in the nest was addled. In 1985 neither of the two eggs hatched and when this year's egg pick-up approached, I was firmly resolved to remove both of the birds' eggs and substitute one good egg so that the pair would have a reasonable chance to raise at least one chick.

When we landed near the nest on 24 May this year we were devastated to find Blue-Red lying dead on the nest marsh. Death had occurred only a day or so earlier and Blue-Red's mate was still incubating the eggs. We removed the dead

bird and one of the two eggs and then, on the following day when it appeared the remaining crane was no longer attending the nest, we collected the second egg as well. One of the two collected eggs was no good but the second egg transplanted to Idaho, hatched and we hope that the chick will survive.

Blue-Red has been examined by the veterinarian-pathologists at the University of Saskatchewan in Saskatoon. The bird was in good condition although there was an indication of a heart muscle irregularity. Further tests of tissue samples may provide us with the answers why Blue-Red died at the relatively early age of nine years.

Although we regret losing a whooping crane, the evidence of poor quality of eggs (at least four of the pair's 7-8 eggs produced from 1983-1986 failed to hatch indicating perhaps a problem of infertility) meant that if we had to lose a bird, it would be better to lose Blue-Red than a known proven breeder.

Also, we were lucky, in a way, to get the dead bird in good condition or even to find it at all. As Blue-Red was a known-age bird its life history is far more detailed than we could have provided for an unbanded bird.



Wood Buffalo National Park

Blake Maybank

SOLO BUT NOT ALONE

COLLEEN GERWING, #3-510 11th Street E., Saskatoon, Saskatchewan. S7N 0G2

Three Novembers ago I was backpacking alone around Sandy Lake and Fish Lake in Prince Albert National Park. Leaves were thick and crunchy underfoot; ice, growing along the shore, tinkled like chimes. Small ponds were already frozen up, but at my Fish Lake camp, a Beaver head desperately broke through the ice every few minutes to keep the hole open just one more night. I spotted another beaver swimming under the clear ice beneath my feet. As I read and wrote by candlelight, the rapidly freezing lake moaned painfully. It grunted as it shivered, then with violent cracking exploded from its nightmare, only to repeat the cycle.

The next morning the beaver lodge was solidly frozen in. There was an electricity in the air as I crossed elk grounds and muskeg. Coyotes began a flurry of vocalizations and I howled back at them. One must have been very near despite the fact that the coyote is a ventriloquist, and it is hard to judge how far away it is. At dusk a lone wolf cried amid a clatter of waterfowl. During the night I awoke to the rhythmic breathing of two canids on the hunt, noisily passing my open shelter.

Far ahead of me on the beach the next morning, I briefly spied a wolf. Much later in the bushy highlands I felt something looking at me. There among the tall aspen and lightly falling snow was the same wolf staring at me 12-15 m away. I stared back in stillness, noting that it was an adult with a healthy coat. I spoke to it in my mind. It seemed confused, slowly taking a step to the side, then back, then forward, cocking its head

with its autumn-gold eyes never leaving me. After a time, the wolf out-stared me. I continued my journey and the wolf slowly trotted away. Throughout the day I would look and listen, but there was nothing. Later, as I sat down for a snack on the east side of Sandy Lake, I could sense the wolf's presence. Suddenly a large cow elk thundered through the trees 10 m in front of me onto a ridge where it stopped. Next came the wolf, but the elk was too fast for the wolf as it ran down the hill and crashed away along the icebound shore. The wolf sat down on the ridge panting for several minutes, then headed to the lake. I could hear it lapping up water as I climbed an overhanging spruce tree with the excuse of wanting to get a better view. Now another grown cow elk roared along the same trail after the wolf. I crawled farther along the tree as they circled and charged each other. The enraged elk eventually left, still snorting and screaming, to join the other elk farther down the lake. After a rest the wolf trotted away in the other direction. The forest fell quiet once again, but I clung to my tree for a long time.

This incident left me with several questions: was the wolf aware of my presence all day? What was the relationship between the two elk? When all this action occurred so close to me, why did all the actors seem to be totally oblivious to me the whole time? Was the wolf a true loner, and how long would it remain a relatively successful hunter?

This trip left me filled with wonder at the wildlife dramas we so seldom get to experience.



Prince Albert National Park

Chris Adam

ESKIMO CURLEW: A VANISHING SPECIES?

J.B. GOLLOP, T.W. BARRY and E.H. IVERSEN. 1986. Special Publication No. 17 Saskatchewan Natural History Society, Box 1121, Regina, Saskatchewan. S4P 3B4 160pp. Paper \$9.00.

Shorebirds need all the attention they can get, for their crucial migratory stopover and wintering habitats are dwindling and many are experiencing increased human disturbance in all phases of their life cycle. Unfortunately we know little about population biology, distribution, or habitat needs of most shorebird species, so cannot prepare sound management plans for many. This is especially true of threatened and endangered species. The publication being reviewed here is therefore both valuable and timely, for it provides a comprehensive account of the nearly extinct and virtually unknown Eskimo Curlew.

Routine introductory material accounts for the book's first 14 pages. This is followed by a summary of known recent sightings (41 sightings of about 80 birds in the period 1945-85), then by notes on field identification, nomenclature and common names (totalling 11 more pages). The Eskimo Curlew is contrasted and compared with the Whimbrel and Little Curlew in plumage and general measurements. Recent photographs and pencil drawings are included, plus a

rather poor figure (reproduction) illustrating differences in tarsal scutellation between the Eskimo and Little Curlew. The descriptions are good, but should have included means and standard deviations for culmen, wing chord, and tail measurements. The sex reported for many museum specimens of Eskimo Curlew may be wrong (p. 33), but some attempt should have been made to characterize sexual dimorphism in this species because it is so pronounced in the family. A map showing localities of known museum specimens (study skins, eggs) and recent sightings would have been a useful addition. Also, the authors should have indicated which institutions hold known specimens, perhaps in an Appendix.

Pages 26-32 provide a fascinating account of Roderick MacFarlane's travels and collecting activities in the 1860's, when he collected about 40 breeding adult Eskimo Curlews and about 30 nests in northwestern Mackenzie District. Photographs of habitat, and a summary of recent Canadian Wildlife Service surveys in the same areas, are included. Despite intensive and extensive searches by Barry from 1958 to the present, no trace of the species has been found. The authors do not indicate if more surveys are planned.

Nine pages provide a useful overview of the Eskimo Curlew's life history, pieced together from MacFarlane's notes on

the breeding grounds and from many other sources for migratory and wintering areas. This section is well written and well integrated, though the range map of one food species, crowberry (Map 5), seems unnecessary.

The next 67 pages ("The Eskimo Curlew's Year") give a detailed summary of sightings, specimens, hunting records and notes, broken down by geographic regions within sections on Breeding (2 pages), Fall Migration (44 pages), Winter (4 pages), Spring Migration (16 pages), and North Atlantic Stragglers (1 page). Each entry includes a specimen total, a note on status, general notes from diverse sources, dates and localities of sightings and specimens, plus commentary. The authors have sifted carefully through a vast amount of literature in preparing this section, which contains a wealth of information summarized as economically as seems possible. Scattered throughout are tables, maps (no. 6, followed by 1-4 then 7), and photographs. The main part of the book ends with some notes about Bodsworth's book "Last of the Curlews" and the animated movie based on it.

Some important Appendices are included: one on MacFarlane's specimen notes; one on George Cartwright's Labrador observations (1770-86); an excerpt from an 1877 hunting guide; and two on bird names in the text. The latter two could have been combined somehow. An extensive bibliography (nearly 600 references) completes the volume.

The book is well organized, despite the confusing numbering of the maps and scattering of habitat shots from pages 27 to 119 (amidst the Appendices). Most of the maps are useful though some of the printing is too small for my taste and the different kinds of lines drawn on them are sometimes hard to distinguish (e.g., Map 2). The map of Galveston Island, Texas,

is poorly reproduced and has tiny lettering. The two maps (nos. 3 and 4) summarizing migration and distribution contain a lot of information and were very thoughtfully designed. The habitat photographs are generally of good quality, and many readers will wish that more from Barry's surveys were included because they are of such interest. The two photographs from Labrador (Figs. 15, 23) are fuzzy and their scale is hard to appreciate.

The publication ends a bit abruptly. I think that the authors owed it to their readers to recommend where future efforts should be placed to try to locate the breeding grounds or to establish a rigorous, intensive survey of stopover areas or wintering grounds. This and other shortcomings all suggest a lack of polish to the overall production. However, none of my criticisms about the work's structure or appearance can detract from its worthy intent or from the immense amount of information carefully gleaned and summarized from historical records, and used to reconstruct life-history attributes and the annual cycle. This book will be the touchstone for future work on this species, and deserves to be widely read, used, and built upon. — Reviewed by *Edward H. Miller*, Collections Management Program, British Columbia Provincial Museum, 675 Belleville Street, Victoria, British Columbia, V8V 1X4 and Biology Department, University of Victoria, P.O. Box 1700, Victoria, British Columbia. V8W 2Y2

NOTICE OF CORRECTION:

The caption for Figure 6 on page 20 of *Eskimo Curlew* should read: "Front views of, from left to right, Eskimo Curlew, Little Curlew and Whimbrel."

BIRD CONSERVATION, Volume 1

STANLEY A. TEMPLE, Editor 1983. Published for the International Council for Bird Preservation, United States Section, by the University of Wisconsin Press. 148 pp. Paper \$12.95.

Bird Conservation is the first of an annual volume published by the U.S. Section of ICBP "to promote the preservation of wild birds, especially in the Western Hemisphere and in relation to U. S. problems of U. S. activities abroad." This publication has been created to provide a vehicle for exchange of information more rapidly than it is accomplished by regular scientific publications. Also, Bird Conservation will include preliminary reports of management activities not normally published by ornithological or wildlife management journals. This volume is organized into three main sections. The first section includes several reports on bird conservation activities written by persons directly involved in the projects. The second section, "Bird Conservation News and Updates," includes shorter reports by experts and the third section is a review of recent bird conservation literature.

Focussing on birds of prey, topics in the first section include the restoration of the Peregrine Falcon in the eastern U. S., protection of Bald Eagles in the northern U.S., and the California Condor reproduction and the recovery program. Philosophical problems are addressed by the authors. These include differences in genetics of reintroduced populations, hands-on versus hands-off approaches to recovery of endangered species and the justification of spending large sums of money in the seemingly hopeless attempt to save a few individuals of a doomed species.

The second section presents information on the Convention on International Trade in Endangered Species, the Ramsar Convention on Wetlands, the Federal Endangered Species Program and the Snake River Birds of Prey Area. In addition there are summaries of conservation projects dealing with Bald Eagles, Harris' Hawks, Peregrine Falcons, Whooping Cranes, parrots of the world, endangered woodpeckers, the Dusky Seaside Sparrow and birds of the tropical South American rain forests. In the third section 162 references are listed and some of the papers are summarized briefly.

The popular writing style used in the well organized reports of this publication make them enjoyable to read. There are a few blemishes, such as the spelling of "rectrix" without a c and the uncritical acceptance of the fact that Whooping Cranes adopt the migration route of their sandhill foster parents as evidence that migration behavior is learned in cranes.

This volume was intended to focus on raptors. Other groups of birds will form the focus of future volumes. Despite the intentional focus on raptors, it is apparent that birds at or near the top of food chains receive a disproportionate amount of attention from conservationists. This is not only because these species are most vulnerable but it also reflects a bias, I believe. It is also apparent that most management efforts represent manipulations of the birds themselves rather than the protection and improvement of their habitat before species become threatened. For example, habitat management on small plots of marshland distributed in a checkerboard fashion in central Wisconsin has saved the endangered Greater Prairie Chicken from extinction.

Bird Conservation does not live up to its aim of disseminating information faster than is achieved by existing publications.

Except for very few 1982 references most information is presented to 1981 even though the publication date is 21 October 1983. Perhaps this shortfall reflects the growing pains of an otherwise useful addition to conservation literature. — Reviewed by *Josef K. Schmutz*, R.R. # 2, Box 123, Saskatoon, Saskatchewan. S7K 3J5

BIRD CONSERVATION

Volume 2, published in 1985 contains references to 1983. This volume concentrates on island birds.

THE MAN WHO PLANTED TREES

JEAN GIONO. 1985. Chelsea Green Publishing Company, Chelsea, Vt. 56 pp. with afterword by Norma Goodrich. Woodcuts by Michael McCurdy. Hardcover \$13.50 U.S.

This magnificent and moving tale was originally published in *Vogue* in 1954 under the title *The Man Who Planted Hope and Grew Happiness*. (The identity of the original translator is unknown.) It is a simple tale of a man, Elzeard Bouffier, who devoted his life to the planting of trees. This single-minded devotion of a single man resulted in the transformation of a desert into a pleasant and productive land.

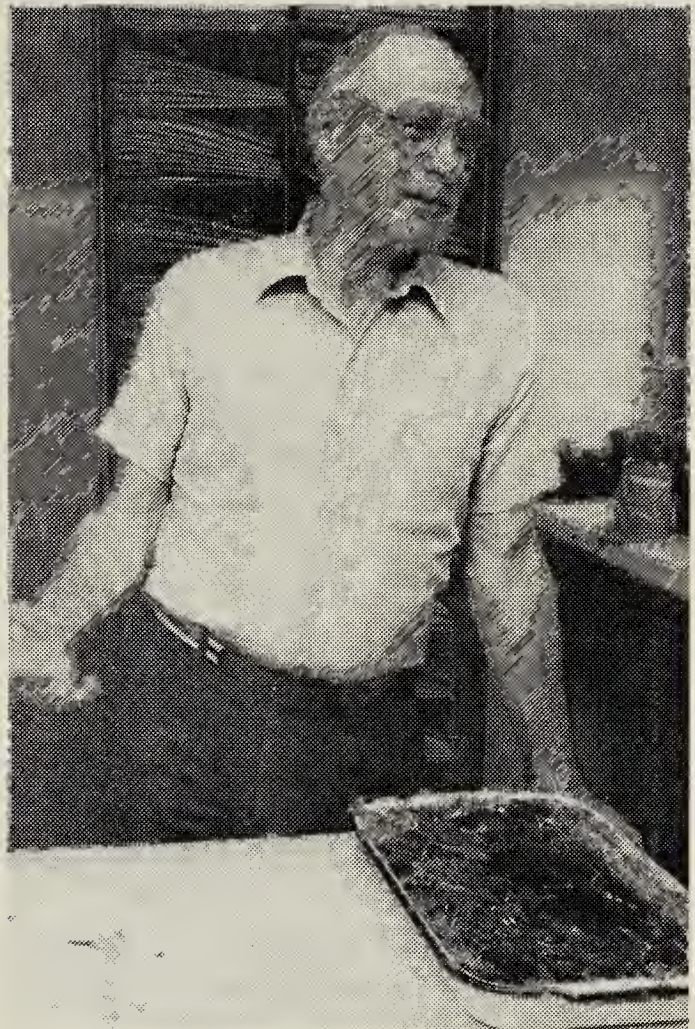
The illustrations are fittingly done from woodcuts, a medium infinitely suited to a story about the value of trees. The simple black and white engravings project the starkness of the original desert as well as the bounty of the recreated land.

One can detect a tongue-in-cheek humour in Giono. He states, for example, that this man could not have accomplished what he did if it had become known to "the administration." "If he had been detected he would have had opposition." He describes with irony the discovery of this "natural forest" by the government, and describes the wonder with which they observe this natural phenomenon of which they had been unaware.

At the same time this many-times reprinted story is an inspiration. It gives the lie to the belief held by so many that one person can do so little to change the direction of events on this earth. I recommend this book both to lovers of trees and nature and those who need to regain a measure of respect for the human race. Whenever a feeling of despondency needs lifting this book will provide a ray of hope. I will treasure my copy and keep it in a prominent position on my library shelf. — Reviewed by *Sheila M. Lamont*, Box 414, Raymore, Saskatchewan. S0A 3J0

HONORARY DEGREE - DR. GEORGE LEDINGHAM

At the fall convocation of the University of Regina on 1 November 1986 Dr. George Ledingham was presented with an honorary degree. A leading environmentalist and conservationist, and a valued member of the Saskatchewan Natural History Society, George Ledingham has been recognised several times in the past few years for his work and dedication towards the establishment of the Grasslands National Park in Saskatchewan. Knowledgeable in all fields of natural history, George has been an asset to any gathering which he has attended, and through his professorship at the University of Regina he has also been able to introduce many students to the study of botany. Now Professor Emeritus, he is curator of the herbarium at the University of Regina. His dedication will continue to be an inspiration to those around him.



CANADIAN PARKS AND WILDERNESS SOCIETY

Effective since 1 September 1986 the National and Provincial Parks Association of Canada (NPPAC) has had a new name, the Canadian Parks and Wilderness Society. The society was formed in 1963 in response to calls for a group to watch over our national parks. It is a private, non-profit, charitable and educational organization for the promotion of the protection of national, provincial and territorial parks and other places of national significance such as wilderness and natural areas. There is a national office and six regional chapters, as well as a quarterly journal Park News.

Information on the programs, membership, etc. can be obtained by calling **(416) 366-3494**, or write the society's national office at **69 Sherbourne Street, Suite 313, Toronto, Ontario. M5A 3X7**

CHRISTMAS BIRD AND MAMMAL COUNTS

Count period is from **Thursday 18 December 1986 to Sunday 4 January 1987**, inclusive. Count area should be a circle 24 km (15 mi.) in diameter. Count forms will be mailed to compilers who submitted counts in 1985. Anyone else wishing to send in a count please write for forms to: **Mary I. Houston**

**863 University Drive
Saskatoon, Saskatchewan
S7N 0J8**

Reports of counts should be sent to Mary Houston as soon as possible after they are taken. To be included in the report in the March 1987 Blue Jay they must reach Mary by **9 January 1987** at the very latest.

NORTHERN FOREST OWL SYMPOSIUM

Biology and conservation of northern forest owls of the world will be the focus of a symposium to be held in Winnipeg, Manitoba 3-7 February 1987. For information contact R.W. Nero, Wildlife Branch, Department of Natural Resources, Box 14, 1495 St. James St, Winnipeg, Manitoba. R3H 0W9

1987 SNHS TOURS

A Series of Nature Tours is currently being organized for 1987. Planned destinations include: Moose Mountain Park & the Souris River (16-18 May); Cambridge Bay, NWT (July); Old Wives Lake (18 July); Hudson Bay Botany Tour (31 July - 3 Aug.); Dinosaur Museum at Drumheller, Alta. (1-3 Aug); Grey Owl's Cabin at Prince Albert National Park (8 Aug.); Duck Mountain Mushroom Tour (12-14 Aug.); Whooping Crane Tour from Saskatoon (4 Oct.).

In conjunction with the CNF Conference in Saskatoon on June 5-8, the society is planning nature tours to: Turtle Lake (2-5 June); Batoche (7 June); Beaver Creek Botany (7 June); Beechy (7 June); Last Mt. Lake (8 June); Cypress Hills (8-12 June); Churchill (8-15 June); Qu'Appelle Valley Botany (8-10 June).

For further information about these tours write to: **Stan Shadick, 3F-1800 Main Street, Saskatoon, Saskatchewan. S7H 4B3**

SOCIETY NEWS

The Annual Meeting was held at Weyburn 10-12 October 1986. Among the special guests at this meeting was Dr. Geoff Holroyd, of the Canadian Wildlife Service in Edmonton. Geoff spoke and answered questions on endangered species and endangered species programs across Western Canada.

Perhaps the highlight of the meeting was Dr. David Henry's after dinner presentation on the Red Fox. David, author of the just published book, *Red Fox: the catlike canine*, used slides and film to give us an intimate look at the lives and behaviour of the Red Foxes of Prince Albert National Park.

Sheina Wait became the first two-time winner of the Larry Morgotch Award. Her winning entry in this competition included excellent photographs of Moose Jaw's Burrowing Owls.

Shirley Brunt was selected to receive the Cliff Shaw Award, for her article "Owls in our farmyard," in the June 1986 issue of Blue Jay. She described some very interesting behaviour of young Great Horned Owls.

The Conservation Award was presented to Connie Gramiak of Hafford, and members of the Redberry Environmental Group, in acknowledgement of their continuing efforts to preserve the unique value of Redberry Lake and its shores for wildlife. They have formed the major opposition to a cottage-resort development planned for the environmentally fragile southwest corner of the lake. Their efforts resulted in an Environmental Impact Study, and the subsequent denial of the developer's application (currently being appealed).

The islands and waters of Redberry were designated a Federal Bird Sanctuary in 1915. The Canadian Wildlife Service ranks this as the fourth most important of its 15 Saskatchewan sanctuaries. Some of the nesting islands are used by protected species. Saskatchewan has nearly half of the world's white pelican population and about 40% of the Piping Plover population. Both these species breed on this lake (pelicans on the islands, plovers on the shore). The White-winged Scoter population is believed to be the largest breeding concentration of the species in North America. Research on Redberry's bird populations has resulted in one of the longest continuous bodies of data in the country, dating from the mid 1950s. The sanctuary status, however, cannot even protect the birds from harassment without some type of enforcement, and the populations are even now being affected by increased recreational use of this lake.

SASKATCHEWAN NATURAL HISTORY SOCIETY

Balance Sheet for the year ended September 30, 1986

ASSETS:

Cash on hand (bookshop)		\$ 40.00
Bank - Current		7,083.74
- Current (bookshop)		3,298.64
- Savings		2,818.47
- Savings (bookshop)		1.08
Investments - Regular Term		81,009.76
- Life Membership		19,449.01
-Manley Callin bequest		118,603.72
Stock on hand (bookshop)		7,665.93
Accounts Receivable		3,850.00
Customer accounts receivable	1,750.63	
less customer prepaid	<u>289.63</u>	1,461.00
Supplier prepaid accounts		<u>233.79</u>

TOTAL ASSETS

\$242,015.14

LIABILITIES:

Accounts payable	4,453.00
Prepaid from ST	10,150.00
Education tax payable	29.29
Honorarium payable	<u>2,972.27</u>

17,604.

TRUST ACCOUNTS

Habitat Conservation - opening bal.	16,356.91	
less grant Loggerhead Shrike	300.00	
plus net donations & income	1,815.87	
plus bookshop earnings	<u>3,500.00</u>	21,372.78
Heritage Marsh - opening balance	3,254.88	
plus donations	2,440.00	
less 1986 contribution	<u>5,000.00</u>	694.88
NCC Ecological		1,050.00
Reserve for computer purchase		1,706.50
Reserve for Spec. Publ. -opening	7,970.00	
less expense(Bird Find.Regina)	3,695.00	
plus donation	<u>500.00</u>	4,775.00
CWS Trust Account re:Webb-opening	2,435.82	
plus 1986 income	<u>192.61</u>	2,628.43
Life Membership Trust Fund		19,549.01
Manley Callin Bequest Fund		<u>118,603.72</u>

170,380

PROJECTS

Burrowing Owl Research - open. bal.	48.34	
less transfer to end. sp.	<u>48.34</u>	0.00
IBP Research - opening balance	4,860.00	
less expenses	4,760.00	
plus income - sale of reports	600.00	
less cost reprinting report	<u>586.23</u>	113.77
Screech Owl Research - open bal.	0.00	
plus return unexpended funds	1,252.86	
less transfer to end. spp.	<u>1,252.86</u>	0.00
Endangered Species Research -open.	4,000.00	
plus wage & WWF-grants	2,798.00	
plus transferred funds	1,301.20	
plus ST Grant	8,300.00	
less expenses + wages	14,519.96	
plus donations	22.05	
plus income contributions	<u>2,000.00</u>	3,901.29
Yorkton Project -opening bal.	25,630.00	
-less expenses to date	<u>22,901.41</u>	2,728.59
Interpretive Programs - ST Grant	3,400.00	
less expenses	<u>178.74</u>	3,221.26
Critical Wildlife - ST Grant	12,000.00	
less expenses	<u>8,000.00</u>	4,000.00
Floral Protection - ST Grant		1,100.00
Natural History Classes - expenses	938.85	
plus ST Grant	<u>1,200.00</u>	261.15

15,32

NET WORTH:

Opening balance	33,748.20
plus tour income (previously unrecorded)	4,063.86
plus net gain	<u>892.05</u>

TOTAL LIABILITIES, TRUST FUNDS & NET WORTH

\$242,015.14

SASKATCHEWAN NATURAL HISTORY SOCIETY

Operating Statement for the year ended September 30, 1986

INCOME:

Membership	20,769.07	
Sustaining and Patron	3,035.00	23,804.07
Donations - general	1,247.80	
Interest - received	7,466.82	
Tour income	2,043.50	
Sales Special Publication	2,873.76	13,631.88
Bookshop sales	30,984.87	
less cost of sales	23,052.79	
gross profit	7,932.08	
less operating expenses	1,277.47	
less honorarium (40%)	2,661.84	
Net bookshop profit	3,992.77	
less contribution to habitat conservation	3,500.00	492.77
TOTAL INCOME		37,928.72

EXPENSES:

Advertising and Promotion	598.59	
less ST grant	1000.00	(401.41)
Conservation Activities-South Moresby	200.00	
-Ellis Bird Farm	200.00	
-computerisation of Saskatoon		
bird records	5,000.00	
-Fort Qu'Appelle Herbarium		
purchase	5,000.00	
-Northern Forest Owl Symp.	250.00	
-Hidden Valley	4,000.00	
-Endangered spp. research	2,000.00	16,650.00
Audit Costs		37.50
Bank charges		27.95
Computer expense		739.00
Employment expense		253.14
Honoraria		900.00
Meeting - annual (profit)		(287.48)
Meeting Expenses - board		295.17
Memberships (Canadian Nature Fed.)		100.00
Misc. Office & Admin.		831.18
Office equipment		225.91
Office Supplies & Stationary	1,045.91	
less ST grant	500.00	545.91
Postage & Express		2,045.45
Blue Jay - printing		14,456.09
- mailing		495.48
Blue Jay News - printing		2,178.30
- postage	3,117.28	
- less ST grant	3,000.00	117.28
Cost of Society publ.		
(Taxon. Reminder)	88.50	
-Qu'Appelle Valley Birds	443.90	
less donation	250.00	193.90
-Eskimo Curlew	9,705.90	
less Env.Can.contr.	7,400.00	
less donation	2,500.00	(194.10)
Telephone		1,676.12
Travel -	1,521.98	
- less ST grant	4,000.00	(2,478.02)
Wages	11,540.80	
less ST Grant	13,000.00	(1,459.20)
EXPENSES		37,036.67
NET INCOME (gain)		\$ 892.05

ATTENTION SASKATCHEWAN NATURALISTS!

Be sure to attend the **SNHS Annual Summer Meet in 1987** being held in conjunction with the **Canadian Nature Federation Conference**, hosted by the Saskatoon Natural History Society, at the University of Saskatchewan, **5-8 June**. We will be celebrating the 100th Anniversary of the Last Mountain Lake Sanctuary -- the oldest in Canada, and 100 years of conservation in Saskatchewan.



16th Annual CNF Conference, U. of S., Saskatoon, 5-8 June 1987

CALENDAR OF EVENTS

- June 2-5 : Pre-conference field trips
- June 4 : Slides, films (evening)
- June 5 : Orientation, annual meeting (afternoon)
: Wine and cheese (evening)
- June 6 : Symposium (all day)
: Banquet (evening)
- June 7 : Field trips
- June 8 : Last Mountain Lake 100 year celebration
- June 8-15: Post-conference field trips

FIELD TRIPS*

- A. Turtle Lake 2-5 June \$175
- B. Blackstrap Park 4 June 20
- C. Batoche Historic Park 7 June 20
- D. Beaver Creek 7 June 15
- E. Beechy Grasslands 7 June 25
- F. Last Mountain Lake 8 June 25
- G. Duck Mountain 8-10 June ** 150
- H. Duck Mt.-Churchill 8-15 June 590
- I. Cypress Hills 8-12 June 250
- J. Qu'Appelle Valley 8-10 June 150
- K. Pike Lake 9 June 10
- L. Meewasin Valley Nature Walk free

* costs estimated

** Trips G-J go by way of Last Mt. Lake

SYMPOSIUM

Theme of symposium -- "A Century of Wildlife Conservation in Saskatchewan." Topics of the speakers include Last Mountain Lake, birds in Saskatchewan, land use, naturalists, Cypress Hills and Grasslands National Park.

AND THERE'S MORE . . .

- Early morning nature walks
- Blue Jay and Nature Canada bookshops
- Accommodation available at University Residences
- Nature art show and nature exhibits
- Banquet and wine and cheese party

REGISTRATION fee is \$30 or less

Sign up early for field trips -- space is limited.

FOR DETAILED INFORMATION PACKET AND REGISTRATION FORMS write now to:

CNF Conference 1987, Box 5094, Saskatoon, Saskatchewan. S7K 4E4

or telephone (306) 652-5970 8 am — 8 pm CST and leave your name and address.

